ARMY ORDNANCE

VOL. XV, No. 87 NOVEMBER-DECEMBER, 1934

When Industry Armed For Defense

Raymond Marsh

Tanks in the Gran Chaco

Robert J. Icks

Realism in Arms Conferences

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Supervision of the Trade in Arms

(Report of the American Delegation)

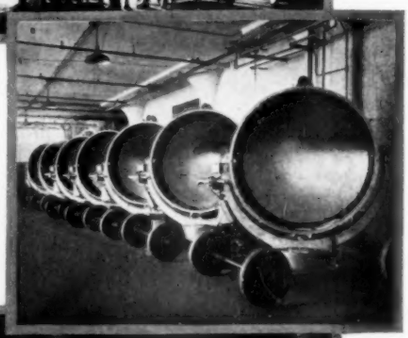
Facts About Munitions Makers, IV

An Editorial

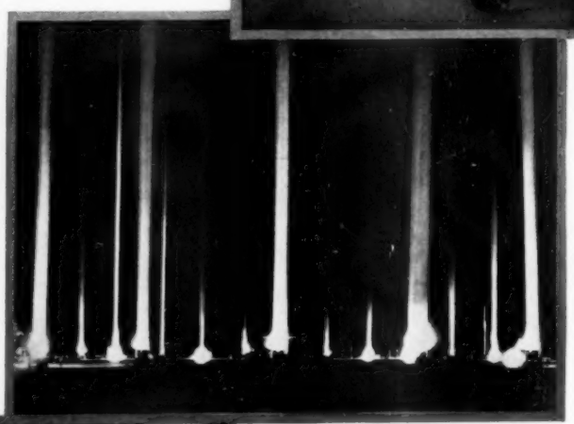
A BIMONTHLY REVIEW OF AMERICAN MUNITIONS
PUBLISHED BY THE ARMY ORDNANCE ASSOCIATION, WASHINGTON, D. C.

U.S. Government *purchases* 83 billion *Beam Candlepower*

A night display



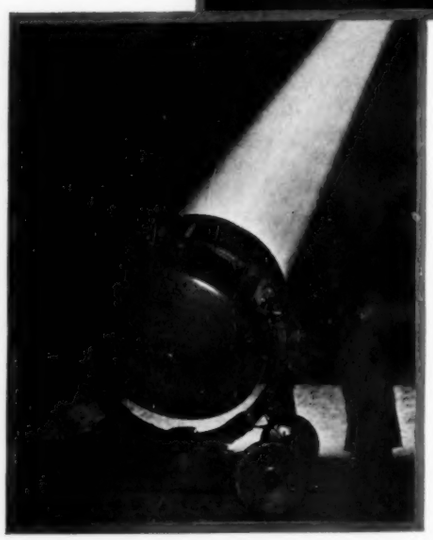
Right: High Intensity Searchlights on the production line.



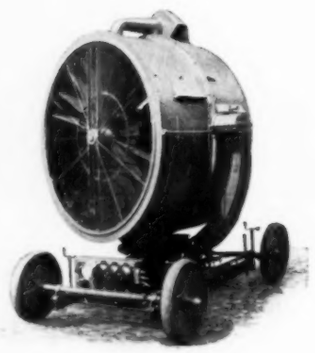
THE recent purchase of 104 Sperry High Intensity Anti-Aircraft Searchlights is an important step in modernization of the equipment of the United States Army. Sixty-one of these 800,000,000 beam candlepower units are of the mobile type (lower left), comprising motor truck with self-contained power unit which is capable of transporting, at high speed, the searchlight and crew. Forty-three are portable (lower right), and a portable power unit is also supplied. This type becomes a trailer when in transit.

These searchlights are constructed almost entirely of aluminum alloy, combining strength with durability and light weight. They make use of the brightest source of artificial light yet developed. The lamp mechanism is fully automatic and positive in action. Remote electric control permits the emplacement of power plant, projector and control station several hundred feet from each other. This increases the useful range and is a protection to the operating personnel. The searchlights are especially designed to permit their operation in conjunction with Sound Locator and Comparator System.

The Sperry Gyroscope Company, Inc. has pioneered in the development of high intensity anti-aircraft searchlights. More than 1200 are now in service throughout the world.



60″ High Intensity Searchlights pierce the gloom of night at Fort Shafter, Hawaii.



ARMY ORDNANCE

The Journal of the Army Ordnance Association

Now in its Fifteenth Year of Publication

Pledged to Public Service in Effecting Industrial Preparedness for War as Our Strongest Guarantee of Peace

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"The opportunities of observation furnished by my brief experience as a soldier . . . . also illustrated the importance—I may say the absolute necessity—of the military science and practical skill furnished in such an eminent degree by the institution which has made our Army what it is, under the discipline and instruction of officers not more distinguished for the solid attainments, gallantry and devotion to the public service than for unobtrusive bearing and high moral tone."—*President Franklin Pierce, Second Annual Message to Congress, December 4, 1854.*

The Army Ordnance Association

THE Army Ordnance Association is a national organization of American citizens pledged to industrial preparedness for war as our nation's strongest guarantee of peace.

The Association endeavors to keep alive an interest in and knowledge of the design, production and maintenance of munitions. Other than a few manufacturing arsenals—six in all—there is no peace-time industry for the production of ordnance. Should war unhappily come again, industrial America will be called upon to produce munitions in great quantity and of intricate and unusual design. In an emergency time will not permit careful study or long preparation for the production of munitions. The problem is one of vital concern.

THE Army Ordnance Association believes that the solution of this problem, based on experience, lies in an active organization at all times coöperating with the Government. The principal objective of the Association is an active membership of American citizens, on whom the duty of design and production of munitions will fall in war, who will have an accurate and authentic knowledge of the complex requirements of ordnance. "Peace insurance" in this form is the foremost aim of the Army Ordnance Association.

The Association is devoted solely to the national defense; it has no commercial interests, no political alliances, and no religious affiliations. It is not operated for profit: its income is expended in furthering its aims. Its officers and directors serve without remuneration.

ARMY ORDNANCE, the journal of the Association, is published solely for the purpose of disseminating information on the progress of our munitions developments so that American industry may at all times know its responsibilities to the common defense.

The objectives of the Association as set forth in its Constitution are:

To assist in effecting industrial preparedness for war as being one of the nation's strongest guarantees of peace;

To keep available the highly specialized knowledge necessary for arming the manhood of the nation by stimulating interest in the design and production of ordnance material;

To promote mutual understanding and to effect cooperation with American scientists, inventors, engineers and manufacturers in civil life and the regular and reserve officers of the Ordnance Department;

To provide, when required, the services of competent committees to investigate and report upon special ordnance subjects;

To assist in developing and maintaining an efficient personnel, both commissioned and enlisted, for the units required for Ordnance Field Service in the event of an emergency;

To commemorate the services rendered by the industry of the nation and by the officers and civilian employees of the Ordnance Department in the wars in which the United States has been engaged.

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ARMY ORDNANCE

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When Industry Armed for Defense

A Review of U. S. Mobilization, 1917-1918

By Raymond Marsh*

IT is difficult, after a lapse of a decade and a half, and with the blurring consequences of complacency that, humanly but inevitably, follows the successful completion of any difficult task, to conceive accurately the immensity, the difficulties and the well-nigh complete lack of conception of and preparation for the problem that was laid on the doorstep of the United States people when, on April 6, 1917, war was declared. Let us examine some of the reasons why this condition existed, the difficulties it produced, the causes of those difficulties, and the measures taken to correct them.

For years prior to the World War, and during the years of that conflict prior to our entry therein, the American people had had preached to them the doctrines of "splendid isolation," the theory that one might be "too proud to fight," the fact that the war was "3000 miles away" and the prophesy that "a million men would spring to arms between sunrise and sunset." As late as the fall of 1916, a successful political campaign had been waged under the slogan "Thank God for Wilson! He kept us out of war." Lulled to quiet by these phrases, the American people looked upon the struggle in Europe with a sense of detachment and with scarce a thought of their own security. Although quite a section of the press hailed President Wilson's first Lusitania note as a "literary masterpiece," the continued submarine depredations of the Germans and their failure to respect neutral's rights gradually awoke the nation, as a whole, to the stark realization that American entrance into the conflict was but a question of time. When, through the exposure of the Zimmerman notes, the blundering attempts of the Germans to involve the United States in a war with Mexico and Japan became known the war spirit of the nation crystallized.

But while the senses of the nation were thus developing the feeling that war was inevitable, the political administration in its efforts to preserve a strict neutrality did nothing to prepare for the conflict and sanctioned only those military measures which by no manner of means could be considered other than purely defensive.

ALTHOUGH the military forces of the United States were thus limited, other forces were at work which were to add immeasurably to the national potential strength. For a generation, prior to 1917, American industry had been developing and expanding from purely local, unconnected and unrelated manufacturing units into manufacturing corporations, nation-wide in their scope and activities.[1] As the war in Europe progressed beyond the capacities of the belligerents to produce their own supplies, they turned more and more to the industrial plants of the United States and for two and a half years American industry, surfeited by European orders for munitions of war, had been solving the commercial problems of producing non-peace time types of products, tooling up for quantity production of these non-commercial items, becoming familiar with these manufacturing processes and training skilled labor along these new lines.

It can be said, too, that the country was becoming "Federal Government" conscious. No longer were the local and state governments sufficient, but nation-wide, federally controlled agencies were being found necessary and created, such as the Interstate Commerce Commission, created in 1887, the Department of Agriculture, organized in 1889, and the beginnings of the Departments of Commerce and Labor set up in 1903 as one department. Of all of these new nation-wide federal agencies that had been established prior to 1914, the one that perhaps played the most vital part in the war effort of 1917-1918 was the Federal Reserve Board, organized in 1913. This was a financial institution, which completely reorganized our national banking system, and which, through the agencies of regional Federal Reserve Banks, distributed throughout the country, and member banks of the Federal Reserve system, coördinated the finances of the country into one great banking system. Although developed primarily to prevent occurrences of financial crises like the panic of 1907, it is the opinion of men like Mr. Baruch and Colonel Scott, and writers like Messrs. Willoughby and Frothingham, that it was "the one means by which it was possible to solve the whole problem of our finances in the World War."[2]

While the people as a whole were being thus aroused from their pacifistic slumbers, and industry was becoming familiar with the problems of munitions manufacture, and the country was becoming accustomed to nation-wide federal control, what was being done with the armed forces of the nation? The Chief of Staff, U. S. Army, in his annual report for the fiscal year 1919 says (p. 8) "The declaration of war, on April 6, 1917, found the United States from a military .... standpoint, thoroughly unprepared for the great task which confronted it." Several things, however, had transpired which made this degree of unpreparedness not as bad as it might have been. "In October, 1915, the Secretary of the Navy constituted the Naval Consulting Board of civilians whose scientific and industrial affiliations made them of value, and this board appointed an Industrial Preparedness Committee which did useful work in gathering data from over 18,000 industrial plants. This may be considered one of the first moves toward our industrial mobilization."[3]

*War Plans and Training Division, Field Service, Office of the Chief of Ordnance, Major, Ordnance Department, U. S. Army.

1Frothingham, T G., "American Reinforcement in the World War." Doubleday, Page & Co., New York, 1927, pp. 23-25.

2Frothingham, T. G., *op. cit.* p. 24. Scott, F. A. Lectures delivered before Quartermaster Convention, March 19, 1927.

3Frothingham, T. G. *op. cit.* p. 31.

On June 3, 1916, the National Defense Act was passed. This contained two very important provisions. First, it provided that "The President, in time of war or where war is imminent, is empowered, through the head of any department of the Government, in addition to the present authorized methods of purchase or procurement, to place an order with any individual, firm, association, company, corporation or organized manufacturing industry. . . . Compliance shall be obligatory . . . . and shall take precedence over all other orders and contracts. . . ." The President was further authorized, in case of any refusals to execute such orders, to commandeer the plant.[4] And second, the Secretary of War was directed to make a list of munitions plants in the United States through a presidentially appointed "Board on Mobilization of Industries Essential for Military Preparedness." This board, composed of three Army officers and two civilians, became known as the Kernan Board. In a report rendered in December, 1916, it recommended that the government should not attempt to produce its munitions independently of industrial concerns, that steps should be taken to provide a complete supply of drawings and gauges, that special tools and fixtures be standardized as far as possible, that expansion of government and coördinated private plants be undertaken immediately, and that the government establish field gun ammunition assembling plants.[5]

The legal existence of the Naval Consulting Board, previously mentioned, was established by an act of Congress on August 29, 1916, which appropriated funds for its operations. It was formally organized on September 19, 1916. It appointed a committee on Industrial Preparedness, headed by Mr. Howard E. Coffin, which made "an ambitious attempt to list, describe and classify all of the industrial establishments of importance in the country. It was made, however, at a time when the nature of the problem and the character of the data needed were not clearly determined, and does not appear to have been as useful in practice as might have been expected."[6]

August 29, 1916, was the date of another important legislative enactment—the passage of the Army Appropriation Act, establishing the Council of National Defense, with its Advisory Commission of seven presidentially appointed members. The Council itself consisted of the Secretaries of War, Navy, Interior, Agriculture, Commerce and Labor. Of the functions of this Council, as provided in the Act, it is important to note that it was charged with the "coördination of industries and resources for the national security and welfare" and with the "creation of relations which will render possible in time of need the immediate concentration and utilization of the resources of the Nation."[7] Despite the comprehensive functions of this Council, it was purely an advisory body. These two bodies were formally organized in October, 1916, and the seven members of the Advisory Commission appointed to head committees formed along functional lines. As need arose, other committees were formed and in late February, 1917, the Council created the Munitions Standards Board,[8] with Mr. Frank A. Scott as its chairman. The purpose of this board was to standardize the needs of the Army and the Navy. Mr. Scott is the authority for the statement that "it was a little late in the day to begin standardization."[9] After an existence of about one month, this Board was reorganized into the General Munitions Board whose function was chiefly that of coördinating—not actually making—purchases and making available to procuring agencies information regarding facilities, resources, materials, etc. From this Board developed, as we shall see later, that super agency, the War Industries Board.

Let us conclude this brief survey of pre-war conditions with an examination of the then existing mechanisms for procurement of munitions and the formulation of war plans which must precede any procurement. An Army General Staff had been in existence since 1903, but its members and funds were so limited that never were more than 28 general staff officers permitted to be stationed in or near the District of Columbia, and on the date war was declared, there were but 19 such officers on duty in Washington.[10] "This resulted in the almost incredible circumstance that even six weeks before war was declared the Army had not even hypothetical plans for the organization and equipment of a force of any size."[11] Procurement functions were exercised by five separate and more or less independent and uncoördinated supply bureaus, governed not only by general statutes applicable to all but also by separate statutes applicable only to certain individual bureaus. The Navy had, by the provisions of the Navy Bill of 1915, been more or less reorganized; a Chief of Naval Operations was authorized who was charged, under the direction of the Secretary of the Navy, with the operations of the fleet and with the preparations and readiness of plans for its use in war. The Naval Bureau of Supplies and Accounts had a much wider and unified scope of action than any Army supply department. Of war reserve, none existed, practically, except some 600,000 Springfield rifles.

Such was the condition of affairs when war was declared on April 6, 1917. Numerous as these preparatory and anticipatory measures and developments seem to be, Secretary of War Baker says of them ". . . . they were but tentative approaches to unknown problems. What was our part in the war to be?"[12] No one knew. The writer well recalls how the newspaper editorial comments in April, 1917, while confessing to our existing military impotency, proudly pointed out that our supplies and dollars were practically unlimited and would be poured out unstintingly to aid our allies. So far as can be ascertained there was no comprehensive war plan for the American effort in France; certainly nothing that approximated an industrial mobilization scheme.[13] The first definite military program was the 30-division program of October 7, 1917, adopted as a result of General Pershing's confidential recommendations of July 10.[14] Even the Balfour and Viviani missions had as their immediate objective financial assistance rather than military coöperation, although it was conceded that we might send overseas a "great army, perhaps 500,000 men."[15]

This absence of a definite military plan in the early weeks

4National Defense Act, June 3, 1916; sec. 120.
5Senate Document No. 644, 65th Congress, 2nd Session, Jan. 4, 1917.
6Baruch, Bernard, "American Industry in the War"—Washington, Govt. Printing Office, 1921, p. 19
7Army Appropriation Act, Aug. 29, 1916, Sec. 2, par. 1.
8Baruch, Bernard, *op. cit.* p. 21.
9Scott, Frank A., The Development of General Munitions Board, Lecture delivered before Army Industrial College, Apr. 30, 1925, pp. 6-7.
10Report of Chief of Staff, U. S. Army, Fiscal Year 1919, Govt. Printing Office, Washington, D. C., p. 18.
11Clarkson, G. B., "Industrial America and the World War," Houghton Mifflin Co., New York, 1923, p. 31.
12Frothingham, T. G., *op. cit.* p. xv.
13Scott, Frank A., "Improvisation as a Resource in Modern War." Lecture before Army Industrial College, April 9, 1926, pp. 6-7.
14Report of Chief of Staff, U. S. Army, *op. cit.* p. 9.
15Frothingham, T. G., *op. cit.* pp. xv-xvi.

of the war made all other programs more or less tentative, but was no bar to the activities which burst forth. Then it was that some of the difficulties to be solved and some of the defects of our peace-time organization made their appearance. Clerical assistance and additional office space were immediately needed, but the law (22 Statutes, 255) prevented the hiring in Washington of employees other than those specifically provided by law by number and salary, and to obtain additional employees estimates had to be submitted by October for such employees, who, with the specific authority of Congress might be employed in the following July. Another law (19 Statutes, 370) prevented the acquisition of additional office space in Washington without a specific appropriation for such purpose. Authority for additional space had to be obtained through estimates submitted in October, approved by Congress, and authorized for action in the following July. The construction of buildings was likewise limited, hampered and hedged about by laws requiring not only the time consuming routine of estimates, special appropriations and specific authorization for the actual construction; but the land on which it was proposed to erect such buildings could be purchased only by a specific appropriation after an exhaustive investigation of the validity of the title by the Attorney General, and with the consent of the legislature of the state in which the land was located.

The existence of laws which made it a penal offense to negotiate contracts for which specific appropriations had not been enacted made the passage of appropriation bills the choke point of many activities. Here again routine and traditional methods caused delay. For example, Ordnance Department estimates based on the good judgment of the Chief of Ordnance had to be reviewed by the General Staff, even when there were no marked differences of opinion, and then submitted to Congress where the totals were broken down into different classes, and each class examined critically by Congress. Accordingly, an estimate submitted to Congress on April 5th did not become law and make the funds available for use until June 15th. Again, an estimate which was sent to the General Staff in June, did not reach Congress until August, and was not enacted in an appropriation bill until October, a delay of more than three months.[16]

NOTWITHSTANDING these limitations imposed by statutes, the delays in obtaining funds, and the inflexibility of the earlier appropriations, the War Department bureaus placed many orders, as well as did the Navy and other governmental agencies involved in the war effort. Without the guiding influence of any military program, there was no conception of requirements in finished products, secondary items or raw materials. Supply bureaus placed orders without reference to any other supply bureau, and without any consideration of a balanced production. As peace-time limitations were raised and generous appropriations voted by a Congress that had pledged the entire resources of the country to the winning of the war, the activities of the several governmental supply bureaus became more and more an uncoördinated competition for men, money and materials. Competition thus developed between departments, between bureaus of the same department, between the United States government and the Allies, and between the war industries and ordinary commercial requirements.

16Crozier, Wm., "Ordnance and the World War." Scribners, New York, 1920, pp. 32-37

Early in the placing of these contracts it was found that the supply of drawings and specifications was woefully inadequate to permit contractors, promptly, to undertake their tasks. This was a result not only of the lack of planning, personnel and funds prior to the war, but also of the fact that practically all of the United States Army peace-time supplies had been required to be produced in government-owned arsenals.[17] That portion of American industry, which, as noted previously, had developed a huge trade in European munitions could not, because of the Allies' increasing demands, now be diverted to American uses except in the outstanding instance of the production of modified Lee-Enfield rifles.

It also soon became evident that within the several supply bureaus there was a profound lack of information regarding our industrial resources and facilities for the production of these things for which there was now a highly competitive scramble. The few manufacturers who, through previous contracts, were known to the Governmental supply bureaus soon became loaded with orders far in excess of their ability to fill.

Because of the limited amount of pre-war manufacturing done in commercial plants for the Army, costs were difficult to estimate and this created delay and difficulty in the making of contracts. One solution of this problem was the evolution of the "cost-plus" contracts whereby the manufacturer was guaranteed a certain profit over and above the cost of production as developed during the contract.

It can be readily seen that this state of affairs produced sharply rising prices, competitive bidding for labor with consequent high wages, congestion of contracts and orders in certain sections of the country and an unequally distributed load on the national transportation system. It was discovered that 25 per cent of all government war contracts had been awarded to manufacturers in New York State alone, a total of 50 per cent in the three states of New York, Pennsylvania, and Ohio, and 25 per cent more in the four additional states of Massachusetts, Illinois, New Jersey and Connecticut.[18]

WE have seen the keen competition and lack of coördination between the several supply bureaus, some the difficulties they encountered, and the general situation that developed. But that was not all. When one governmental activity attempted to fix prices with the meat packers, for example, the Department of Justice initiated prosecution for violation of antitrust laws. Labor employees in the northwest finally succeeded in persuading radical labor leaders to suspend their trouble-producing activities through appeals to patriotism and the use of a generous wage scale. But then the Department of Justice began to indict these same leaders for previous acts of conspiracy. Again, the railroads were prevented by law from pooling their financial resources to enable them to function as an operating unit.[19]

This state of affairs continued for several month. Finally, in December, 1917, "The munitions program was approaching a state of paralysis. Certain factories were loaded with contracts far beyond their ability to obtain materials, labor, transportation or new factory facilities. In like manner, certain whole manufacturing districts were so overloaded with war business that their utmost in facilities, labor, fuel, trans-

17Crozier, Wm., *op. cit.* p. 22.

18Clark, Hamilton & Moulton. "Readings in the Economics of War." The University of Chicago Press, Chicago, 1918, p. 223.

19Clark, Hamilton & Moulton, *op. cit.* pp. 218-221.

portation and power was entirely inadequate to the handling of the contracts in any reasonable time. And while in these districts there was great labor scarcity, and while projects were being delayed as a consequence, in other districts not so attractive to the competing war bureaus, there was actual unemployment, both of men and of facilities. The congestion of war business within certain districts was a heavy contributing cause of the fuel shortage that nearly disrupted industry in those weeks. The unwise concentration of contracts also resulted in shortages in electric power in these districts. Every bureau dispatched its finished products to the ports as rapidly as it succeeded in procuring them. There, the port officers had to take into consideration the balanced lading of vessels and also the immediate and more pressing needs of the A. E. F., for the available tonnage was scant. Consequently, they were unable to ship many of the materials reaching the ports. Army freight choked the ports and, backing up, clogged the rails so far back from tidewater that freight transportation for a time altogether ceased.[20]

A summary of the difficulties encountered and their causes show that there was, first and foremost, no comprehensive military plan for the American effort in France; second, no coördination between the various governmental activities; and third, a lack of knowledge of the industrial resources and manufacturing facilities of the country. Because these three essentials were missing, there was (a) no knowledge of requirements of finished products, raw materials, labor, fuel, power, transportation or manufacturing facilities; (b) delay caused by limitations imposed by peace-time laws and inflexibility of appropriations; (c) inadequate supply of drawings, specifications, jigs, dies and gauges; (d) delay due to gropings for suitable contract forms and terms; (e) competition between procurement agencies with the inevitable rise of prices, shortage of material and bidding for and turn over of labor, and (f) concentration of orders with a consequent congestion of traffic and shortage of fuel, power and facilities.

WE may now examine the remedies applied to this situation. The activities of the Council of National Defense have been traced to the formation of the General Munitions Board, in April, 1917. The purpose of this board was not actually to make purchases, but to exercise sufficient supervision over the distribution of government orders to prevent competition among the several purchasing agencies of the Government, to assist in the acquisition of raw materials and manufacturing facilities, and to coördinate and establish precedence between the orders of the United States Government, the Allies, and the necessary commercial and industrial activities. A large number of committees of producers and manufacturers were created with the idea that they would serve as centers of contact where there would be exchanged information regarding supplies, production capacities, requirements and future needs. Some degree of coördination resulted, but the tremendous and rapid expansion of both the governmental war machine and the board and its subsidiary committees, coupled with the fact that the board had only advisory powers, with no compulsion on the part of the purchasing bureaus to follow this advice soon produced confusion, overlapping of duties and conflict of jurisdiction. Dissatisfaction with the board, largely from industry itself, and the vague feeling that the board was doing business with itself, caused a reorganization of the board.[21]

On July 28, 1917, the Council of National Defense, with the approval of the President, created the War Industries Board, which took over the duties of the Munitions Board. Three things are to be noted about this new board; first, it was smaller than its predecessor, consisting of but seven members; second, it was authorized to so reorganize the existing advisory committees on particular industries and materials as to keep those committees subordinate to the board; and third, the members of these committees were to be direct representatives of the Government with no financial connections with the industries concerning which they advised.[22] The board organized along functional lines, and took over some of the commodity committees which had been operating under the Council of National Defense. The shortage in certain commodities brought to the board its first important problem. To direct these commodities to the channels of government use, it was necessary either to outbid all prospective purchasers or to initiate control through priority and price-control methods. These two functions had been undertaken by the General Munitions Board, but had not developed to any great effectiveness. Another function initiated by the General Munitions Board and developed by its successor was that of clearance, *i.e.,* the approval for procurement of a schedule of immediate or prospective supplies. This was "the first effort directed specifically to bringing system into the confusion of government orders."[23] But it was "the priority system which was destined to become the most characteristic feature of the whole scheme of war-time supervision,"[24] *i.e.,* the system of determining the preferential treatment to be accorded demands for supplies. Price control was largely effected through informal agreements with industry and was more or less confined to raw materials. While the War Industries Board was thus organizing and developing, not new and additional agencies, but reorganizing, coördinating and simplifying bodies already in existence and those for whose being a need had been felt, the Food, Fuel and Railroad Administrations, the Shipping Board and War Trade Boards were established by acts of Congress. But the War Industries Board still remained a subordinate body to the Council of National Defense, possessed of only advisory powers, with no legal responsibility and no administrative powers. As need for its actions arose, it had to depend upon coöperation and good will and sometimes the legally responsible departments of the Government raised the doubt about their obligation or even right to defer to the decisions of such a merely advisory body.[25] As a result of the conditions of the winter of 1917-1918 and the increasing demands for munitions, in prospect, a feeling developed that the Board's scope and effectiveness should be increased, or that a new munitions department be created. Consequently, under date of March 4, 1918, a letter from the President reconstituted the Board, removed it from the jurisdiction of the Council of National Defense, enlarged its powers, and made it an administrative body directly responsible to himself, and vested in the chairman the ultimate decision of all questions, except the determination of prices, on which question he should be governed by the advice of a committee of a designated com-

20Crowell & Wilson, "How America Went to War," p. 5.

21Baruch, Bernard, *op. cit.* pp. 21-22.
22Baruch, Bernard, *op. cit.* p. 22.
23Baruch, Bernard, *op. cit.* p. 34.
24Baruch, Bernard, *op. cit.* p. 47.
25Baruch, Bernard, *op. cit.* p. 24.

position. From this time on, the control and coördination of war activities grew in scope and body. This control was further strengthened by an executive order issued on May 28, 1918, after the passage of the Overman Act, which authorized the President to coördinate, consolidate and redistribute functions among executive agencies as he deemed fit.

The function of the Board finally resolved itself into twelve logically and well defined functional divisions as follows: priority, clearance, conservation, resources and conversion, advisory committee on plants and munitions, labor, technical and consulting section, purchases for Allies, planning and statistics and price fixing. These divisions, or sections, obtained their information from, and gained contact with industry through, some sixty-odd commodity committees corresponding to as many groups of industry.[26]

PRICE fixing never became a direct function of the War Industries Board, but was handled by a committee which reported directly to the President. This committee did not initiate price fixing regulations but in the attitude of a quasi-judicial body, upon the recommendation of the appropriate War Industries Board commodity section, heard the case in question, and then presented its findings directly to the President for his action.[27] Thus, the influence of the Board was paramount and through the power of requisition and the exercise of priorities, adequate means were available for enforcing price schedules.

Labor administration and control was largely outside the Board's jurisdiction and was handled first by an advisory committee of labor of the Council of National Defense, then by the War Labor Administration. Other Boards such as the National War Labor Board and War Labor Policies Board were established to deal with certain phases of labor. However, the War Industries Board, through its labor committee had representatives on all these other boards and effected the greatest coöperation.

Between the several national war administrations and boards mentioned above—Fuel, Food, Railroad, Shipping and War Trades—coöperation was effected by means of representatives for each board being on all other boards. Mention may be made of the agreement effected with the Allies whereby their purchases were supervised by a commission of the War Industries Board, thereby effecting a coördination of Allied requirements with our own. Coöperation between the War Industries Board and the Railroad Administration on the subject of transportation, was particularly effective largely through the exercise of priorities which the Board applied to shipments and rolling stock as well as to materials.

Of all the fields covered by war-time activity, the one in which the least trouble was encountered was that of finance. This, as has been indicated, was due to the operations of the Federal Reserve System. To supplement and further control financial operations in the country, the War Credits Board, the War Finance Corporation and the Capital Issues Committee were set up. The first arranged for funds to contractors, the second aided financial institutions, and the third operated to prevent the employment of capital in non-essential war-time industries.

WHILE the War Industries Board was thus being evolved, developed, expanded and clothed with adequate power, a reorganization and development process was likewise going on within the War Department. In February of 1918, the General Staff was reorganized into five main divisions—Executive, War Plans, Operations, Purchase and Supply, and Storage and Traffic. It was further provided that the Chief of the Purchase and Supply Division should have cognizance and supervision of the purchase and production of all munitions and other supplies and be charged with the supervision and direction of all purchases, procurement and production activities of the several bureaus, corps and other agencies of the War Department. Further consideration led to the consolidation, in August, 1918, of the Purchase and Supply Division with the Storage and Traffic Division in the new Purchase, Storage and Traffic Division under a director, who was definitely charged with "the control of the . . . . procurement and production activities, including real estate, of the several bureaus, corps, and other agencies of the War Department . . . . the storing and warehousing of property for all departments, bureaus, and corps of the Army . . . . the movement of all property of the War Department . . . . and the transportation of troops and supplies overseas."[28] This new procurement division was organized along lines roughly paralleling the organization of the War Industries Board. A requirements section was provided to supervise, coördinate and consolidate War Department requirements and provide the medium of contact with the corresponding section of the War Industries Board. Similarly, there was an Army clearance section, which acted on schedules of immediate or prospective purchases; a priority section which determined precedence of orders as between bureaus; and various commodity sections, which coöperated with similar sections of the War Industries Board. The new division included an Embarkation Service, which, in close coöperation with the Navy and the Shipping Board, controlled the shipment of troops and supplies overseas, after an Inland Traffic Service Section had directed the movement of these items from camps, factories and depots to the ports of embarkation through close cooperation with the Railroad Administration. Requirements for storage facilities were likewise coördinated through the central agency of this new division. The procurement activities of this division were limited largely to supplies of a general commercial nature, the procurement of technical or highly specialized equipment remaining with the technical corps. This reorganization was made possible by the passage of the Overman Act[29] and the apparent rise to power of the General Staff as a procuring agency was fundamentally only an organization through which the Assistant Secretary of War, as Director of Munitions, could exercise his control and transmit to the operating services, through military channels, his executive decisions.[30]

ONE other phase of the War Department reorganization may be noted. The Aviation Section of the Signal Corps was separated from that corps and in May, 1918, organized into a Bureau of Aircraft Production and a Department of Military Aeronautics. This facilitated production and coördinated, for the first time, the aviation program with the rest of the Army program.[31] Aircraft production seems to have been carried on with but little control from the other production and coördinating agencies although the War Industries Board's priority powers were applied to it. This line of activity seems to have enjoyed general public approval to a

26Clarkson, G. B., *op. cit.* p. 61.
27Baruch, Bernard, *op. cit.* p. 79.
28Report of Chief of Staff, U. S. Army, *op. cit.* pp. 19-20.
29Report of Chief of Staff, U. S. Army, *op. cit.* pp. 17-18.
30Crowell & Wilson, *op. cit.* p. 11.
31Report of Chief of Staff, U. S. Army, *op. cit.* p. 22.

greater extent than any other. Perhaps in this new implement of war the people saw a short cut to victory. But despite this approval, the appropriation of huge sums and a greater freedom of action than was accorded any other procurement agency, the results were exceedingly disappointing.

Behind all this reorganization, two fundamental principles stand out. First, industrial leaders—not politicians—were called upon to take a direct and leading part in the industrial mobilization of the country; and, second, the amplified, undefined, and well-nigh unlimited, war powers of the President were looked upon as the most potent source of authority. In connection with this, perhaps the most important war-time legislation was the Overman Act, which confirmed the President's acts and placed on the statutes his authority to so act as to aid the economy and the more efficient concentration of the Government. One other point may be emphasized. In all this reorganization, shifting of functions and the concentration of authority, there was no destruction of existing agencies, no setting up of entirely new mechanisms, such as the British Ministry of Munitions. To the contrary, full use was made of all existing facilities and the apparently new bodies which came into being were but evolutions from existing bodies.

FROM this study, a summary can be made of the factors which must be considered in preparing general plans for procurement and industrial mobilization in a national emergency.

1. With respect to the War Department: First, there must be a war plan based on a strategic conception of the national war effort which will indicate the theatre of operation. This war plan should be complete with schedules of mobilization of man power, tables of organization, lists of equipment, material replacement data and estimated consumption of munitions during the early activities.

Based on this war plan, a comprehensive program of requirements must be worked out involving not only the primary requirements of finished articles, but these primary requirements must be broken down into commodity requirements and the secondary requirements of power, fuel, transportation, etc., the whole program to be closely coördinated with respect to time with the war plan.

Adequate reserves must be provided in time of peace to supply the war requirements until the procurement and industrial mobilization plans are put in operation and producing current requirements and mass production under way.

There must be sufficient drawings, specifications, jigs, dies and gauges in existence to permit contractors immediately to start production. And corrollary to this, matériel must be standardized and existing drawings and specifications followed without modifications.

Industry must be educated, in peace time, in the manufacture of munitions by "educational orders," which will not only give industry an opportunity to train personnel, acquire tools, develop processes and become familiar with the problems of munitions manufacturing, but will also show defects in drawings and specifications, remove pilot mounts from the laboratory method of construction and make possible mass production.

Estimates for appropriations for these requirements must be kept up to date through the calculations of current costs based on these educational orders.

A study should be made, and the record kept constantly up to date, of all hampering and limiting peace-time statutes and regulations which should be presented to Congress for prompt repeal upon the declaration of the existence of a national emergency.

Procurement agencies in the War Department must be so organized as to provide strong central control, but with decentralized operations with appropriate concentration of authority and coördinating control, designed to prevent competition, coördinate requirements and centralize the exercise of the power to commandeer.

An organization must be provided to keep up to date data regarding the industrial resources of the country, manufacturing facilities and current production capacities. Such data will be invaluable in the prompt placing of early contracts so as to avoid geographic concentration of orders and congestion of certain districts, will permit full utilization of existing facilities and promote prompt production.

Studies must be made and kept current of strategic raw materials, their sources of supply, reserves, acceptable substitutes, need for naval protection of importing sea routes and legislation which may promote domestic production and conserve natural reserves of such material.

2. With respect to national industry: Provision must be made for the early functioning of a super agency along the lines of the War Industries Board, either by the establishment of a skeleton organization in time of peace, the utilization of the Council of National Defense, or the preparation of appropriate legislation to be presented to Congress for prompt enactment, simultaneously with the declaration of the existence of a national emergency.

In conjunction with such a board, or with the various national trade and engineering societies and associations, there must be mapped out the general policies to be followed regarding labor, the preservation of existing industrial organizations, price fixing, contract forms, fuel, food, power, transportation, conservation, elimination of excess profits and the distinction between essential and non-essential war industries.

Either by coöperation with the Federal Reserve Board, or provision for the early establishment of subsidiary financial bodies, arrangements must be provided for financing of contractors, assistance to financial institutions and control of the employment of capital in the non-essential industries of the country.

In all of these arrangements, two elements must be stressed—flexibility of plans to meet changed conditions in the future, rather than rigid adherence to lessons derived from past experience; and the imperative necessity for the saving of time, the most vital element in the waging of war and the one element for which there is no substitute and no improvisation possible.

To conclude, no better summation is possible than to quote John C. Calhoun, President Monroe's Secretary of War, who, in his report for the year 1820, referring to peace-time organization to insure war-time preparedness and efficiency, said: ". . . . the leading principles in its formation ought to be that at the commencement of hostilities there should be nothing either to new model or to create. The only difference, consequently, between the peace and war formation . . . . ought to be in the increased magnitude of the latter; and the only change in passing from the former to the latter should consist in giving to it the augmentation which will then be necessary." This "Calhoun Doctrine" is indeed sound.

Realism in Arms Conferences

National Self-interest—Not Glib Phrases—Must Govern

By Dudley W. Knox*

AS we approach another international conference on the limitation of naval armaments, through conversations in London between American, British and Japanese representatives, it is well to consider means of avoiding the unfortunate ill-will which has accompanied past conferences of this nature, and has sometimes reached such heights as even to cast doubt upon the peace value of arms reduction through conferences.

At Washington in 1922 we witnessed a heated controversy between two principals, followed by strained relations between them for several years afterwards. The Coolidge Conference at Geneva in 1927 ended in disagreement and much subsequent friction. The London Conference of 1930 was accompanied by tense argument. Serious wrangles without agreement has been the result of the General Disarmament Conference which has been held at Geneva under the auspices of the League of Nations over a period of years. In all of these worthy efforts such great stress has been laid upon the promotion of peace as the cardinal object of the conferences that when one nation or another has hesitated or refused to accept disadvantageous terms, it has been freely charged with sordid selfishness, aggressive motives or plotting wars. With more realism in the premise there would be less venom in the conclusion.

The promotion of peace is certainly one great and praiseworthy aim of the limitation movement, but the due safeguarding of national interests is at least equally important as an object of conferences. There the delegates are representatives of governments, each one of which exists for the prime purpose of protecting and promoting the welfare of its own people.

The fundamental and essential trusteeship of governments is necessarily extended to government officials of all classes, including delegates to international conferences, and the failure of any of them diligently to care for the interests of his own nationals would amount to violation of a high trust, if not treachery. A conscientious delegate is therefore very likely to place his responsibilities towards his own country above duties to world peace; especially so since he may be certain that, regardless of high sounding phrases, the delegates from other countries will do the same when it comes to the dotted line.

The degree to which world peace can be furthered by agreements to limit armaments is therefore plainly circumscribed by the extent of reduction to which governments and their delegates feel that national self-interest will permit. The sooner this is frankly recognized and stripped of pretense, the quicker will pass the dangers to world peace through frictions arising from the conferences themselves, and the easier will come agreements upon limitation.

Lubrication for limitation of armaments might also be found in a limitation of insincere propaganda, which now seems to have no bounds. Armament is not militarism and neither is it war. Yet persons of high intellectual capacity strenuously endeavor to lead us into the error that all three are practically synonomous. Armaments may be used equally well for keeping peace as for waging war.

LOOSE thinking crusaders for peace would also have us believe that armaments are the principal cause of war and on that ground they advocate disarming America. And this in face of the fact that the United States was almost completely unprepared when she undertook nearly every war in her history. Analagous circumstances may be cited with respect to many other countries.

The provocations arising from conferences would be lessened, and the cause of world peace together with the movement towards disarmament would be advanced, by an honest and open recognition of the normal morality of armaments. As with nearly everything else in the universe it cannot be their existence or legitimate use, but their abuse, which is not moral.

Armed forces, from those established by small communities to those maintained by great nations, are a basic requirement of civilization in the present stage of human development. Without them society would undoubtedly "crack up"; we could have neither law, order, justice or security to person or property. A policeman may commit cold and quite unwarranted murder with his pistol or club. An armed nation may resort to wanton aggression with its army or navy. Yet obviously it is proper that a policeman should be armed, just as it is for a nation, however immoral may be the abuse of weapons and force.

In any event these are the firm convictions of a great majority of persons and governments, whose motives and morality have been so freely assailed for holding and practicing their views, and whose resentment has been correspondingly aroused. This is not the way to constructive limitation of armaments, nor to an atmosphere conducive to permanent peace. While due limits on arms are unquestionably favorable to peace, they can never be an effective substitute for a wholesome attitude of mind nor for disciplined character.

The best way to work for the success of the forthcoming conference devoid of war-breeding quarrels, is with an implement of realism rather than of pretense or of crusader-like, provocative idealism with a superiority complex. Morality is not at issue. Within the boundaries of national interests there is ample room for responsible government officials acting as trustees for the welfare of their peoples, to agree upon mutually beneficial terms.

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Editor's note: Prime Minister Ramsey MacDonald of Great Britain, in an address, November 9, 1934, said "Some of the most ardent pacifists, when dallying with pure ideas and abstract faiths are the most war-spirited advisers in foreign policy I have ever known. I have heard them blame us for taking no steps which in a brief time would dot our country with state munition factories; turn the League of Nations into an armed camp and bring us into conflict with other nations swiftly and surely. We are blamed for not doing these things by people who wish to protect women and children against war. That is not how the foreign policy of this government will be conducted."

Tanks in the Gran Chaco

Their Use Under Conditions of Jungle Warfare

By Robert J. Icks*

BOLIVIA and Paraguay went to war technically in June, 1932, and continued for many months without the formality of a declaration of war. Let us review the general situation before discussing the limited use of tanks in actual engagement. The conflict has been brewing for over a hundred years because of a failure to establish boundaries of a well-delineated territory and because of wars during the 19th century in which both countries lost other territory. Bolivia wants access to the sea and, to secure it, control of the entire Chaco Boreal is necessary because of the position of the Paraguay-Parana River. This river is navigable for steamers of nine-foot draught from Asunción, at the southeastern extremity of the region, to the Atlantic Ocean at Buenos Aires. Paraguay refused because she had already developed timber, cattle, and other industries in the region and because it represents a strategic bridgehead against the alleged aggressive designs of Bolivia. In 1934, the League of Nations Commission indicated that petroleum was the real cause of the war and that armaments played a great part. Neither of these statements was amplified in the report and can, therefore, be discounted.

A Brazilian writer quotes the agreement which all Latin republics accepted, that the boundaries of the new republics be determined in conformity with the Spanish laws in force in 1810. He states that the Bolivian boundaries inherited from Spain included all the Chaco Boreal while the western boundary of Paraguay was the Paraguay-Parana River, and charges that Paraguay advanced her claims to the region at a time when Bolivia was torn by internal dissension. Nevertheless, had not Peru objected to the cession of the Tacna-Arica region to Bolivia in 1926, when this was acceptable to Chile and Bolivia, the sanguinary struggle over the Chaco Boreal probably would not have taken place.

The Chaco Boreal, or Gran Chaco as it is generally called, is an area of over one hundred thousand square miles bounded to the north and west by Bolivia, on the east by Brazil and Paraguay, and on the south by Argentina. The eastern boundary is the navigable Paraguay-Parana River, and the southern boundary is the Pilcomayo River. It comprises swamp, tropical timber and dense jungle, interspersed with grassy areas suitable for cattle grazing. Most of the roads are jungle trails alternately thick with dust or unbelievably muddy. In summer, from November to March, the heat is extremely humid and in the winter, from April to November, the watercourses are dry, particularly receding westward from the Paraguay-Parana. Flies and other insects abound in all seasons. There is little wonder that the region has been called the "Green Hell."

However, this name is by no means literally correct. Within the past several years colonization has been on the increase and many improvements have been made especially in the eastern portion under Paraguayan influence. This is the big reason advanced by Paraguay that the territory should be hers. Bolivia, on the other hand, regards this work as that of foreign capitalists who are under Paraguayan military protection. Bolivia's development has taken place principally in the north and to a lesser extent, along the Pilcomayo.

EACH country pushed its forts forward until the lines almost met. It was inevitable that a clash occur. Most of the forts were small barracks consisting of stockades or roofless wooden or adobe huts of little military value. Only two were really forts, Muñoz, a Bolivian fort, and Ayala, a Paraguayan. Scouting parties of both armies constantly roamed through the territory between the opposing forts. Naturally, the greatest concentration of forts was to be found in the direction of the southeastern corner of the area as in this direction lay the shortest route for Bolivia to the Paraguay-Parana River. After the beginning of military operations the forts in the zone of operations were extended to include complete systems of entrenchments.

Both armies are using modern matériel, including airplanes, tanks, flame throwers, artillery and trench mortars, machine guns, automatic rifles, etc., with automatic weapons in preponderance. The armaments are purchased outside the two countries. Machetes are indispensable, being used both as tools and as weapons. Motor transport is in considerable use but the attrition is great. The roads are cut leaving stubble standing with the resultant slowing up of transport and tremendous wear and tear on tires and vehicles.

The Bolivian Army had been trained by a German military mission and was modernized in many respects. The Paraguayans had had a French mission for a similar purpose until 1931 when the French mission was replaced by one from Argentina. However, where the Bolivians reorganized completely, the Paraguayans retained their loose organization of volunteer troops under volunteer regimental commanders who were more or less self-directing. The Bolivians took to training in modern warfare where the Paraguayans preferred more primitive methods. Of the two, the latter seem the better natural fighters and more inured to jungle conditions. The Bolivian army was made up of highlanders, mostly Indians, under trained officers. The active armies at the opening of hostilities were about 5000 men on either side, backed up by more or less trained reserves.

THE Bolivian army has been successively commanded by native Bolivians, by a naturalized German, and then again by native Bolivians. Most of the officers are trained men and many of them are American, English and German soldiers of fortune. Although better supplied later than at first, the Bolivians were limited in their advance by the increasing distance from their base of supplies. The Paraguayans had the advantage of volunteer troops and of retaining the same commander who is thoroughly familiar with the region.

On June 15, 1932, the inevitable meeting between patrols took place. The Bolivians captured the tiny post of Fort C. A. Lopez, an event which was celebrated a year later in both capitals. Several other minor clashes took place, and during the following month, the Bolivians took Fort

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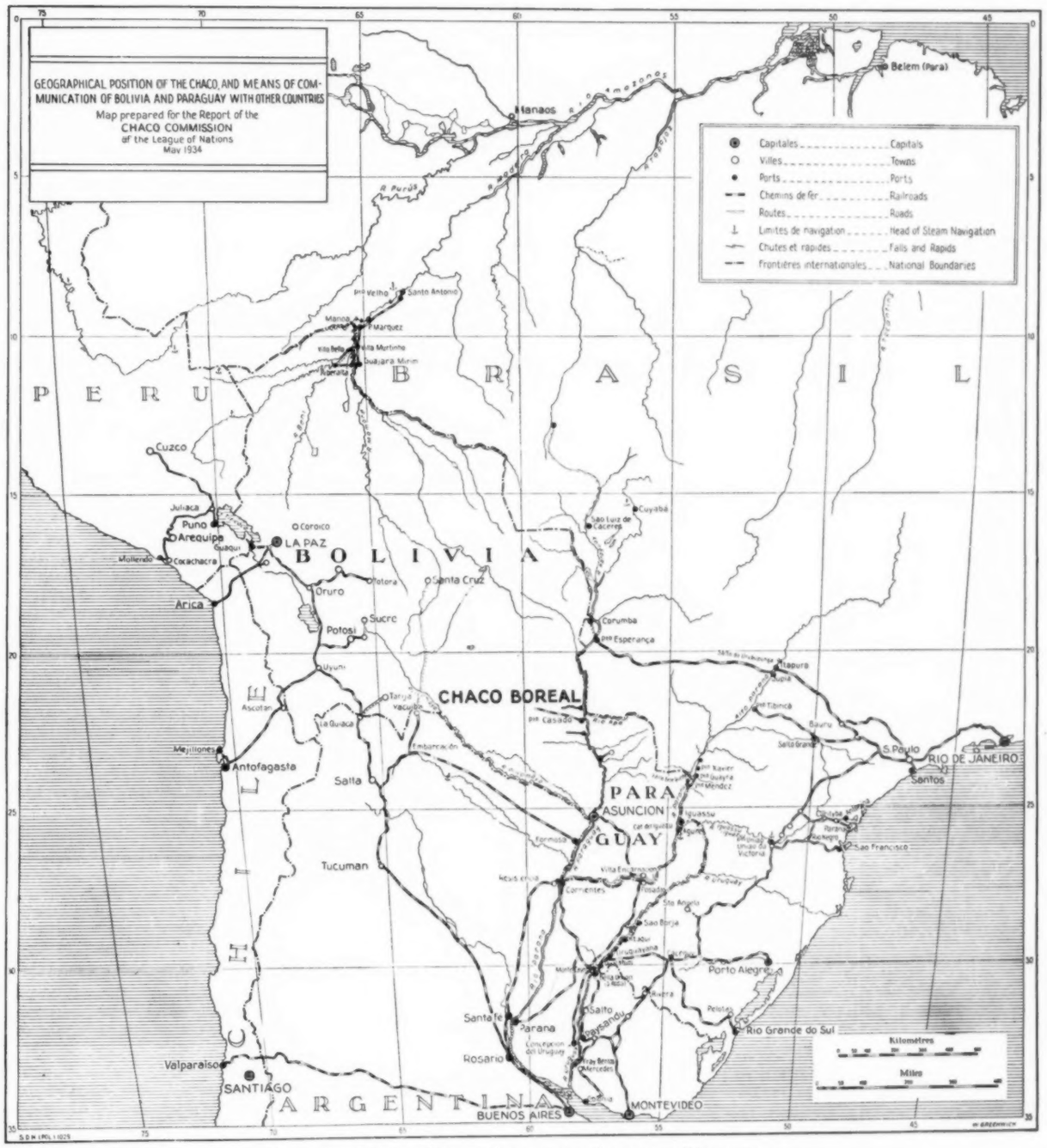


GENERAL MAP OF CHACO BOREAL AND ADJACENT TERRITORY.

Boqueron. The war actually began when Paraguay attempted to retake this position. Both sides fed more and more troops into the region until a state of trench warfare developed with the battle line extending from Loa in the north to Fort Chañar on the Pilcomayo. Paraguay declared war on May 10, 1933, but Bolivia has never done so. The tide gradually turned in favor of Paraguay and, in November 1933 began the increasingly successful Paraguayan attacks which caused huge Bolivian losses and forced them back to a defensive position at Ballivián, where the Paraguayans have launched several unsuccessful offensives since April 1934.

As the Paraguayans advanced, their supply difficulties increased while those of the Bolivians improved as they retired. Villa Montes is the Bolivian base which the Paraguayans have set as their objective. Capture of this would choke the Bolivian military forces all through the Chaco. (See maps on page 146.)

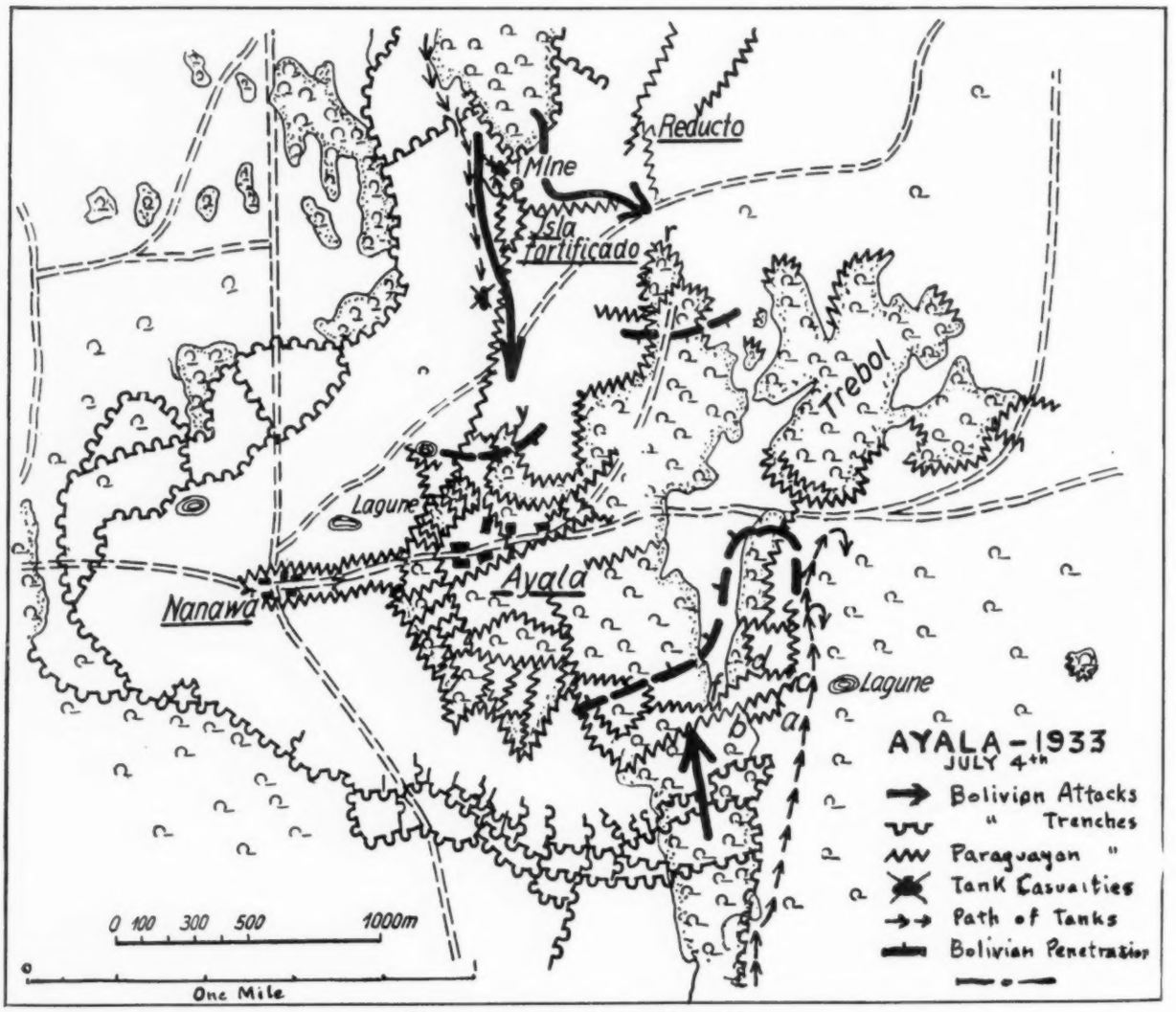
A northern Bolivian army was formed to operate toward Fort Galpón to relieve the pressure on Ballivián. It was hurled back to Carandaiti in July and the Paraguayans turned the Bolivian left flank at Ballivián almost reaching Fort D'Orbigny, threatening isolation to the Bolivians at Ballivián and to their line of communications. Should this be successful, there is every possibility that the Paraguayans will win the war. The main danger to them is the present extent of their front, reaching from Ballivián to far-off Carandaiti.

CHACO conditions developed types of warfare which may be illustrated by the following examples, the first at the month-long battle of Saavedra late in 1932 and the second, the somewhat more mobile tactics of middle 1933.

In the jungle, between the fort and a clearing some miles north, the Bolivians had built a formidable trench line which the Paraguayans could not overcome. Machine gun nests in towers built on stilts prevented the attackers from making advances through the occasional clearings. The Paraguayans also entrenched and brought up artillery. For a month the daily routine was the same. Dawn brought the artillery bombardment on both sides followed by Bolivian bombing plane attacks. By 11 A. M. the heat became intense and hostilities were suspended until late afternoon at which time there were occasionally some infantry activities but more often not. Occasional Paraguayan night attacks were halted by the Bolivians through the use of flares.

The jungle prevented flank movements on a large scale and in 1933 the tactics had changed somewhat. Patrols gained contact with the enemy by chopping their way through the jungle with machetes until the noise attracted the attention and fire of the enemy who thus disclosed his position. Diggers were then brought up to consolidate with trenches the positions of the patrols. Troops came up in numbers to hold the position and later to attempt raids, mass attacks, or attacks by infiltration in order to continue advancing.

The struggle is a singularly pitiless and horrible one. The fighting has been in the bush, in a trying climate, and far from centers of population. Medical service is inadequate. Behind the lines, both countries are becoming impoverished in men and resources, universities are closed, disease has been brought back to civilian regions where such malady was previously unknown.



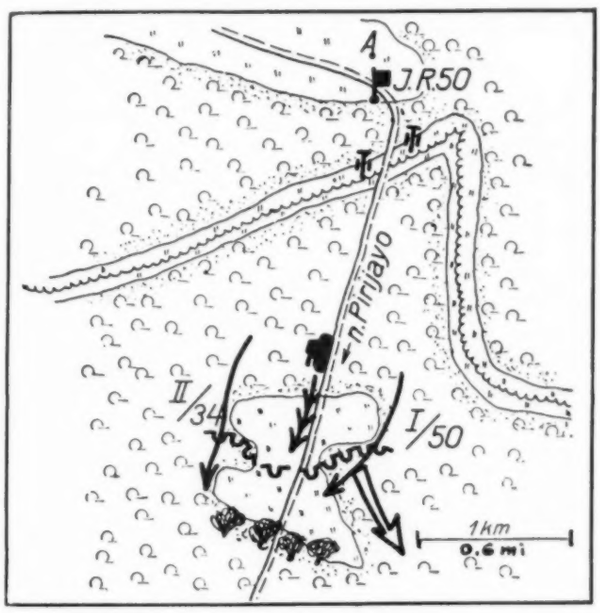
TANK ACTION AT AYALA, JULY, 1933.

It is difficult to realize the magnitude and ferocity of the struggle now in its third year. The armies have varied in size from 30,000 to 50,000 men. Conservative estimates place the total losses at 25,000 Bolivians and 12,000 Paraguayans killed and 50,000 Bolivians and 26,000 Paraguayans ill or wounded. In addition, the Bolivians have lost at least 16,000 men as prisoners of war. In comparison with the size of the countries and the armies this is a far greater ratio than in the World War.

So long as the two sides seem to base their changing demands on the chimera of future military success in direct

ratio to those successes, any peace negotiations are suspended or broken off as operations develop. The League of Nations, the neighboring South American countries, and religious leaders have been attempting peace negotiations from the start but with no success for this reason.

THERE is not a great deal to learn from the use of tanks in this war, but it may be interesting from the standpoint of general knowledge to discuss briefly the tactical application of tanks to the difficult conditions of jungle warfare. Bolivia



TANK ACTION AT PIRIJAYO, AUGUST, 1933.

alone possesses tanks, of the Carden Loyd and the Vickers 6-ton varieties.

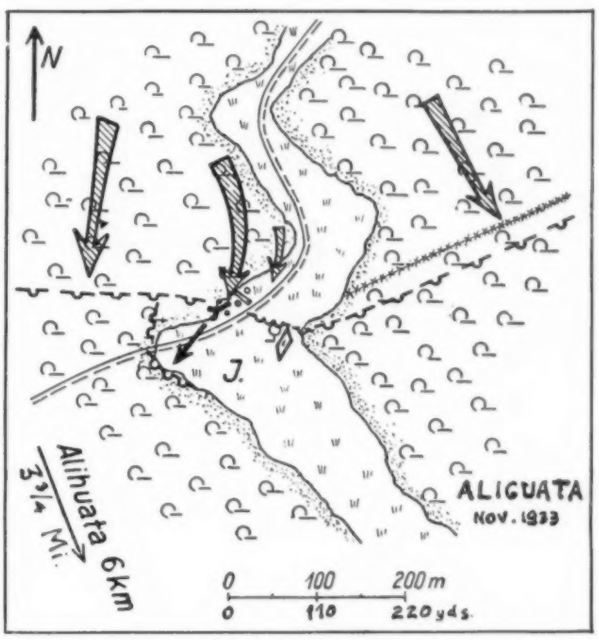
Few opportunities arose for the use of tanks but it is known that the 3-man tanks were superior when used. Difficulty of control was experienced when once the tanks were committed to action, for this reason the platoons were cut from five to three tanks. Maintenance was highly developed due to the novel use of two and three alternate crews because of personnel fatigue and casualties. Tank radio was not very successful although radio communication in infantry units was highly so. The tanks, instead, used sirens.

In the July 4th attack on Ayala both sides were entrenched at a salient west of Ayala and the Bolivian attack was to straighten this salient. The wings were to form the main attack while the center was to hold. Two 6-ton tanks supported the right wing and one 6-ton and two Carden Loyds the left, each attacking with approximately three infantry battalions of 450 rifles and 20 machine guns each, a dismounted cavalry regiment, flame throwers, two 65-mm. guns and two Stokes mortars. On the left front a mine had been driven. The Bolivians opened the attack with an artillery preparation from 25 guns and 12 howitzers for 15 minutes. The mine was exploded. It was short but its moral effect was great. For reserves, the Bolivians held three additional regiments on the right, one in the center and two on the left.

The Paraguayans had little artillery and that held its fire until the infantry attack began. The Bolivian preparation had been poor as many Paraguayan machine guns had been untouched. These had armor-piercing ammunition. On the left the infantry gained but little. One 6-ton tank assisted for two hours until it became a direct hit. Shortly after the opening of the attack one Carden Loyd had been put out of action and the other had upset. On the right the tanks led the infantry until mechanical difficulty in one and an armor-piercing bullet causing a turret jam in the other, forced both to withdraw. They were repaired, entered action again, and again withdrew after the entire crews of both were wounded.

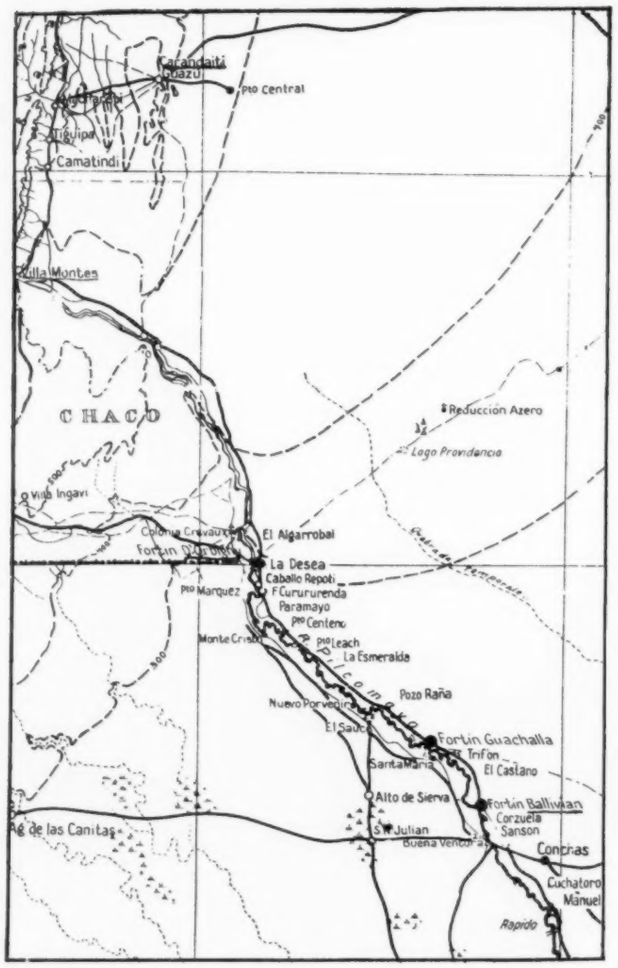
In the afternoon the Paraguayans counterattacked with partial success. The following day the Bolivians attacked unsuccessfully with two tanks, one of which broke down, whereupon the tank commander refused to allow the other to continue alone in the face of the artillery and machine gun fire. The attack was a failure due to the possession by the Paraguayans of large numbers of machine guns, their prodigal use of apparently unlimited infantry reserves, and restricted terrain for the insufficient number of tanks employed.

On August 24, 1933, the Bolivian infantry, in advancing against Pirijayo on the Gondra front, came upon a Para-

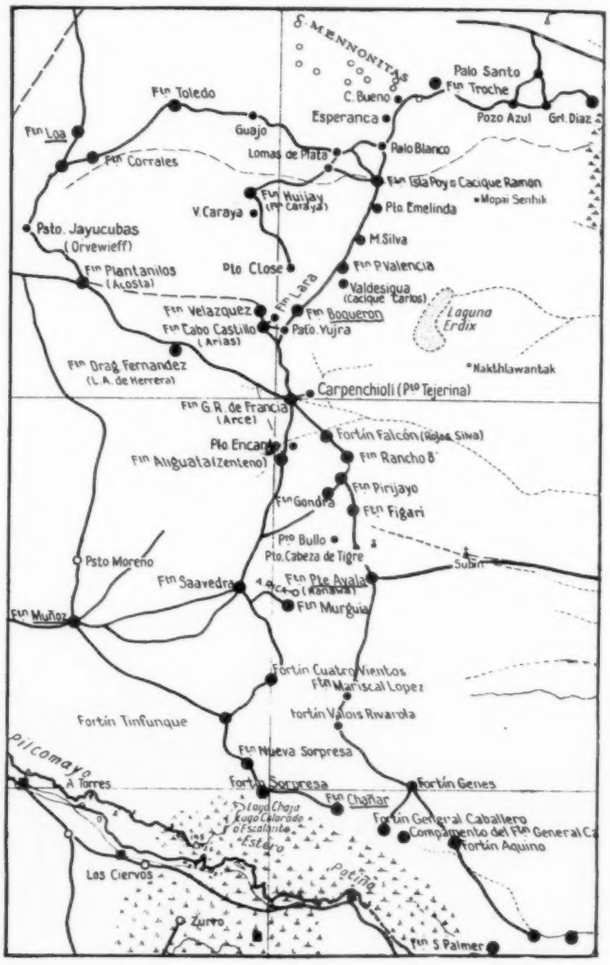


TANK ACTION AT ALIGUATÁ, NOVEMBER, 1933.

guayan position in a clearing. The infantry was exhausted and the artillery was some distance in rear. They extended their flanks to establish those of the enemy and called for the tanks which were at rest 10 miles northwest of Pirijayo. Two 6-ton tanks with a reconnaissance section and a supply truck moved up two hours later. The artillery opened fire on the edges of the clearing and the tanks advanced into the clearing with a similar object and were finally forced to halt to fire because of the difficulty of seeing their targets. The infantry advanced through the jungle on either side of the path. The impact of machine gun bullets against the tank hulls was almost continuous. The temperature was 95° Fahrenheit and metal was hot to the touch in the tanks. Both the 47-mm. and the tank machine guns jammed time after time from the heat and finally the tanks withdrew. In both tanks, most of the crew members were incapacitated, they had been wounded or had collapsed from the heat.



VILLA MONTES—THE PARAGUAYAN OBJECTIVE.



WHERE TANKS WERE USED IN THE CHACO.

However, the surprise use of tanks drew much of the enemy fire and the Bolivian infantry had advanced meanwhile with few casualties, the Paraguayans in the center retiring when their flanks had been turned. Six hours from the time of the original halt Pirijayo was taken, the tanks refuelled and were placed at nightfall as strong points against counterattack.

This latter use of tanks as strong points came into being later in the war when the Bolivians had no reserve infantry, every available weapon being required to bolster up the thinly held front line where a battalion of infantry of 300 men with 25 machine guns was used on a front of one mile. The tanks were then spread in small groups over the front as mobile reserves.

On the Gondra-Aliguatá sector in November, 1933, the front line consisted of foxholes with the second line a mile in rear protected in some places with wire. Early in the month the Paraguayans began attacking at various points on this front and broke through the front line north of the position shown on the sketch map on the morning of November 15th. Two Carden Loyd tanks were ordered up from the reserve at Aliguatá but one broke down. The other, accompanied by a heavy machine gun, moved into the grass grown *cañadon* or dry run, meeting the retiring Bolivian infantry as it moved to its position behind a big bush in the middle of the *cañadon*. The artillery was in process of changing position but rifle fire continued as the Paraguayans advanced through the jungle east and west of the road down the dry run.

Late in the afternoon the Paraguayans attacked strongly over a front of three miles to either side of the tank position and especially at the *cañadon*. Paraguayan attacks with and without machine guns at the tank position were repulsed with terrific losses. That night the run was searched by Paraguayan artillery but with poor marksmanship. On the 17th the artillery moved nearer and the tank, being in danger of direct fire, withdrew and returned to the reserve at Aliguatá. These were the only occasions on which tanks were used in the war.

George Larden, a British Army officer on leave, visited the Bolivian front late in 1933 and the following statement from his article in the April issue of *Blackwood's Magazine* is taken as a fitting summary of the military aspects of the entire campaign:

"The infantryman, backed by the machine gun, has . . . once more proved his domination of the field of battle when the latter lies in thick and impenetrable country; for, without observation or room to maneuver, such arms as artillery, tanks or even airplanes can be of little value. Indeed, the Bolivians, who relied to a great extent on these arms to compensate them for their other disadvantages have been somewhat disillusioned, and it is to their credit that their morale remained unshaken when the results they hoped for failed to materialize." Tanks have their uses and their limitations.

A Chronicle of Ordnance

II, The Story of Barbed Wire and Machine Guns

By Aiken Simons*

WHEN the World War is mentioned to the average man the mental picture which first occurs is a limitless area of barbed wire rendered all but impregnable by vast numbers of machine guns. It is an interesting fact that although this war developed the use of this defensive armament, yet both barbed wire and machine guns had reached mechanical perfection some time before and only the tactical development had remained imperfect.

The making of wire is one of the oldest forms of metal working; originally it was done by beating out gold or copper.

AMERICAN TROOPS REPAIRING BARBED WIRE ENTANGLEMENT, OCTOBER 5, 1918.

The art of drawing wire seems to have been developed in Germany about 1350. Iron wire was drawn in England in the XVth century and an iron wire suspension bridge over the Schuylkill River, above Philadelphia, existed in pre-Revolutionary times.

The use of wire in defensive warfare is relatively modern. Palisades, spikes, caltrops, abatis, thorn fences and other such impediments to the rapid advance of the attack have existed from time immemorial. They have, however, the disadvantage of obscuring the vision and fire of the defense. Just when the use of wire as an obstruction was first developed is uncertain. Any material for military purposes must be readily available before its use is practical. Thus it is suggested that the Morse patent of the electric telegraph in 1848 and the subsequent construction of many miles of telegraph lines must have made wire generally available. In 1851 there were fifty companies using the Morse patent in the United States and many in Europe.

No military manual of this era has been located in which the use of wire entanglements is mentioned. When South Carolina seceded from the Union in December 1860 Major Robert Anderson of the 1st U. S. Artillery was in command of a small garrison at Fort Moultrie on Sullivan's Island at the mouth of Charleston Harbor. This island was a summer resort and the cottages were so closely built to the fort as to make it untenable. Major Anderson installed a palisade of pointed stakes to stop any rush. On Christmas Day 1860 Captain Abner Doubleday approached Major Anderson and requested permission to buy a quantity of wire to form an additional obstruction and was told that he might buy a mile of it if he wished. On the night of December 26 Major Anderson transferred his troops by boat to Fort Sumter in the center of the harbor and safe from escalade, so that the plan was not put into practice. Doubleday does not claim to have originated the idea but this is the first recorded plan for its use.

Later the Confederates used wire entanglements at Fort Sumter and at Vicksburg. On the afternoon of May 15, 1864, Brevet Major General William Farrar Smith, U. S. A., instructed his troops to gather telegraph wire from the turnpike road in front of the Willis house near Drewry's Bluff, Virginia, and to stretch it along the stumps in front of their position. When the Confederates attacked they were twice repulsed before succeeding and Federal accounts state that they were piled in heaps on this low wire entanglement. This account is confirmed by a sergeant in a South Carolina infantry regiment who used to give a seriocomic account of a one-armed colonel trying vainly to cut the loose swinging wire with his sword and finally throwing down the sword in profane disgust.

Barbed wire was patented in the United States in 1874 by Joseph F. Gledden of De Kalb, Illinois. Forty thousand tons were produced in 1880 in this country where its use was general. In England and some continental countries its use was prohibited by law on the humanitarian grounds that it would lacerate cattle, hence it does not seem to have come to the attention of European military engineers. When General Gordon entered Khartoom in February 1884, he ordered the construction of wire entanglements in front of the earthworks along the river front. These, however, were of smooth wire.

The first reference to barbed wire by the Oxford English

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A Tank Handles the Barbed Wire.

Dictionary is in 1881 and a British Manual of Field Engineering, dated 1888, discusses and illustrates a barbed wire entanglement. Barbed wire was used extensively by the Spaniards in Cuba in and before 1897 and by the British in the Boer War in 1900. The Russian permanent fortification of Port Arthur designed in 1900 made extensive use of barbed wire entanglements.

From then on its use became universal with increasing depth and complexity. In 1918 a normal entanglement was considered to be three separate lines about 50 feet thick each. To cut this with four lanes for each battalion in attack it is estimated that 48,000 rounds of 75-mm. ammunition would be required and if 36 guns were employed, 13 hours of actual firing time in addition to the time to bring up the guns and ammunition.

CONSIDERING the machine gun a device to increase the fire power of an individual rather than the method by which this fire power is obtained, any multibarrelled fire arm may be included in this category. This was the purpose and type of the Ribaudequin. The derivation of this word seems to have been from a soldier slang word of the XVth century meaning a disreputable female camp follower. The Ribaudequin consisted of several arquebus barrels fastened together and held in a cart having a stout shield protected by pikes. It may also be considered the genesis of the tank. When the French under Gaston de Foix defeated the combined Spanish and Papal Armies at Ravenna in 1512 there were thirty of these Ribaudequins in front of the Spanish infantry. This type of fire arm was also known as "orgue" or "organ gun" and there is mention of the Royalists having captured two of them in the War of the Parliament in 1644 at Copredy Bridge.

In the Museum of Sigmaringen there are two guns with five barrels made in the middle of the XVth century and in the Arsenal at Soleure is a gun having forty-two barrels to be fired six at a time. The arsenal at Zurich has a small copper gun about 27 inches long capable of firing ten successive shots by means of a sliding horizontal breech block containing the charges, signed by Welten, the inventor in 1742.

Probably all readers interested in arms are familiar with Bannerman's Catalog and its facsimile reproduction of James Puckle's invention: "A portable Gun or Machine called a Defence, that Discharges soe often and soe many Bulletts, and can be soe Quickly Loaden as renders it next to Impossible to Carry any Ship by Boarding." One of the most important features of the invention was its adaptability for "shooting square bullets against Turks and round bullets against Christians." This is in effect a six-chambered revolver and seems to have had spare cylinders which could rapidly replace those just discharged. The patent dated May 15, 1778, was valid for fourteen years but there is no evidence that the gun was ever tried out or even constructed.

The improvement in machine work in the first half of the XIXth century which made accurate fitting attainable and the development of the metallic cartridge case about 1850 rendered possible the repeating rifle, which differs only in detail from the machine gun.

An early machine gun was the "Requa," patented by Billinghurst and Requa of Rochester, New York, September 16, 1862, which consisted of twenty-four steel rifled barrels arranged in a horizontal row and carried on a wheeled axle with a trail similar to an artillery mount. The cartridge, about caliber .50, had no percussion primer but had a small opening in the base and a flanged head, which rested between two metal clips whereby the whole charge of twenty-four was inserted as a unit into the chambers. The breech block had a single hammer and nipple for a percussion cap but also had a groove in which a train of powder was placed which ignited all the cartridges at the same time, the flame from the train penetrating the hole in the rear of the cartridge. The report of the Chief of Ordnance, U. S. A. for 1866 indicates that five of these guns were purchased for $5,482.72, or about $1,100.00 each.

Three of these guns were used by the Federal besiegers of Battery Wagner in front of Charleston, South Carolina, in August 1863 but apparently gave the Confederates little concern. A sergeant of the 25th S. C. Infantry then in Wagner reported that they were outraged by the rifles of the garrison. They seem to have caused so little notice that one otherwise very accurate writer attributes them to the Confederate de-

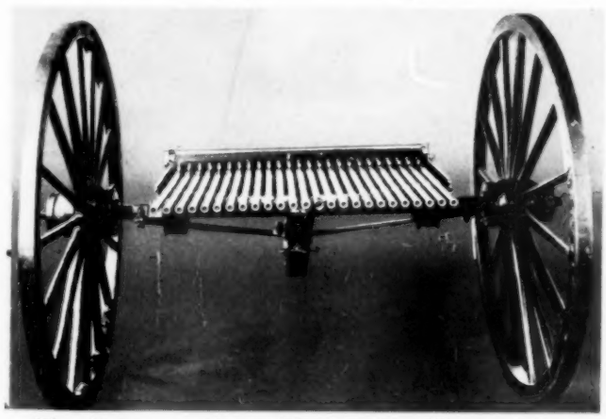
fense. At all events they were the first machine guns with metallic cartridges used in actual combat. One of them is now in the Museum at Springfield Armory.

THE annual report of the Chief of Ordnance for 1876 tells of an exhibit at the Centennial of a historical series of "The Vandenburg Volley Gun, the Requa battery, Guthrie & Lee repeating two-barrel gun, Union repeating or Coffee Mill gun, and Gatling short barreled .45 caliber gun."

The latter was invented by Dr. R. J. Gatling in 1861, who in 1862 exhibited a working model firing 200 rounds of caliber .58 cartridges per minute. In the same year six of these guns were made by Miles Greenwood & Company of Cincinnati, Ohio, but were destroyed by fire before they could be put into action. Others were built and a report on their test was made by General Wright to the Chief of Ordnance dated March 11, 1863. Tests were also made at the Washington Navy Yard and reported on May 20, 1863.

It is said that General B. F. Butler had several Gatling guns in his Bermuda Hundred Campaign in May 1864 but no record in the reports of either side can be found to justify the statement. It is probable that since none of the Gatling guns had been purchased or issued by the Federal Army, they were operated on this and other occasions by demonstrators for the inventor or manufacturer.

The Gatling gun consisted essentially of six breech blocks and barrels grouped in a circle around an axis to which they were parallel. The gun was built in calibers of .47, .55 and 1.0. Cartridges were fed in by gravity from a hopper and the barrels were caused to rotate around the central axis by a crank turned by hand, which also served to open and close the breeches and load and fire the cartridges. When the gun was in action at any given instant one of these barrels was being fired, those on one side were being emptied for loading and cartridges were being inserted and pushed home in the other three. The weight of the gun and its mounting took up the recoil and a water jacket on the barrels prevented overheating.



THE REQUA—AN EARLY MACHINE GUN USED IN 1899.

IN 1851 a Belgian officer, Captain Fafschamps, invented a machine gun of which he made elaborate drawings and even a rough model which he offered M. Montigny, a Belgian arms manufacturer. Shortly after this Montigny made some of these guns for the defense of Belgian forts. Improvements were made on this gun and in 1869 the Emperor Napoleon III introduced it into the French Army as regular equipment.

"Mitraille" originally meant "langrage" or scrap metal of all shapes and sizes formerly fired from muzzle-loading cannon against attacking troops. Later on it came to mean case shot, canister, or grape shot. Since the first tactical conception of the machine gun was entirely defensive, the word *"Mitrailleuse"* was coined to describe the Montigny machine gun whose production was begun at the French Arsenal at Meudon in 1869 with an excessive amount of secrecy. Only officers and men assigned to its use were allowed to see it.

GATLING GUN IN THE TRENCHES OF OUTER MANILA, CULI-CULI, MANNED BY U. S. VOLUNTEERS, NOVEMBER, 1899.

Guarded and exaggerated accounts were given to the newspapers and the public was led to believe that France had a weapon which would render her invincible by annihilating her foes en masse. When France mobilized against Prussia in 1870 the Mitrailleuses were always covered up and sentinels posted over the guns to prevent unauthorized inspection.

Notwithstanding all of this it was no great secret. Major Fosbery of the British Army had been instructed by the British Indian Government to report on the gun with a view to its adoption by the Indian Army and in 1869 published a paper in the Journal of the Royal United Institute "Mitrailleuses and Their Place in Wars of the Future" in which he said that he superintended the manufacture of such a gun at the Belgian factory, which gun was later tested at Woolwich Arsenal. Major Fosbery's description is of interest and is quoted:

"The Montigny mitrailleur consists of an assemblage of barrels contained in a wrought-iron tube, mounted much on the same principle as an ordinary field gun which, indeed, it somewhat resembles in form. To this a massive breech action is attached sliding between heavy iron plates. This is controlled by a jointed lever, and contains a simple contrivance for the separate and successive ignition of the cartridges. The cartridges are carried in steel plates perforated with holes corresponding in number and position to the chambers of the barrel, of which, indeed, these holes form portions, being bored and finished with the same tools, and at the same time as the chambers themselves. These plates are about eleven millimetres in thickness, and when the cartridges (which are central fire) are dropped into them they stand out at right angles in proper position for introduction into the chambers of the gun. Grooves formed on the face of the breech-block receive the plate, which, being dropped into them, advances or retires with the breech-block itself.

"A plate of cartridges being introduced into the gun, the gunner would depress the lever, which he holds in his left

hand, the breech-block would advance, pushing each cartridge into its appropriate barrel, and finally becoming secured in its place beyond chance of accidental disturbance by recoil or otherwise. The contrivance which effects this is a very simple and perfect one. At the same time and by the same motion the whole weapon is set at full cock, ready for firing.

"The gunner now quits the loading lever, and grasping the firing handle at the right side of the gun awaits the order to fire. One second of time is sufficient to give a complete revolution of the handle and discharge the whole of the thirty-seven barrels, of which the weapon consists, but each may be fired separately and at any intervals of time. When the last barrel has been discharged, he raises the loading lever, thereby opening the breech, and withdraws the empty cases by means of the plate, which now performs the office of an extractor, or rather of thirty-seven extractors in one. The plate is lifted from its groove, carrying with it the empty cases, and replaced by one filled with loaded cartridges, and the operation is repeated. To open the gun, remove the empty plate, insert a full one, and re-close ready for firing takes somewhat less than four seconds. It has thus been found possible to fire this weapon twelve times per minute, throwing therefore 444 rifle shots in that time. This I believe to be the largest number ever yet thrown by a machine of like weight, though others pretend to the possession of greater powers in this particular."

THE mitrailleuses with which the French hoped to destroy Prussia were much the same. They weighed 3,960 lbs. including a limber with 2100 cartridges and had a caisson carrying 6,000 more cartridges.

A battery consisted at first of six guns, six caissons, a rolling forge and two baggage wagons. Needless to say the troops serving these guns utterly lacked experience in their care and operation. Worse still because the guns looked like artillery, artillery they were, and were placed in battalions consisting of two field gun batteries and one mitrailleuse battery of ten guns. The range of the mitrailleuse was at best that of the French Chassepot rifle, say one thousand yards, so that they were easily outranged by the Prussian Krupp field guns and presented a helpless target for shell fire by which they were again and again put out of action.

When the mitrailleuses were used properly to reinforce the infantry firing line they were capable of excellent results. At Gravelotte on August 18, 1870, the mitrailleuses opened on the flank of a Prussian heavy battery already weakened by infantry fire and led to the capture of these guns, the only ones lost by the Germans in this war. The French also purchased Gatling guns in America which were used intelligently and effectively at Le Mans in January 1871.

The Bavarian contingent in the German Army had a machine gun called the "Feld" consisting of twenty-four barrels in parallel rows. It was operated by a crank and capable of 300 shots per minute. It had the disadvantage of jamming and overheating. Notwithstanding its successful use in the Loire campaign, its drawbacks created a prejudice against all machine guns in the German Army which existed for years.

In 1871 a Technical Committee of the British Government submitted a report requesting that some Gatling guns be purchased for trial by the land and sea forces. A .65-inch was proposed for ships and coast defenses and a .45-inch gun for use with Colonial or expeditionary forces of Great Britain.

Russia purchased 400 Gatling guns in 1871. Of these, 48 were sent to the Caucasus and 24 to Central Asia, where they proved very effective against the massed charges of native horsemen. In the Khiva campaign two of these guns saved the day against overwhelming numbers of Turcoman Cavalry, making an attack at dawn, who were repulsed with terrible losses. They were also used by the Russians at Plevna in 1877 to stop Turkish sorties. The above guns were hand operated and multi-barreled as were the first types of Hotchkiss, Nordenfeldt and Gardiner.

THE first automatic machine gun when the power to load, cock, fire and extract was taken from the force of recoil of the previous discharge was patented by Hiram Maxim on July 16, 1883. Later on Sir Hiram Maxim developed the "Pom Pom," which was in effect a 1.457-inch Maxim machine gun throwing a projectile weighing about one pound and containing a bursting charge, this being the lightest bursting projectile allowed by the Declaration of St. Petersburg, signed December 11, 1868. Maxim gave a demonstration of his guns to the German Kaiser, who was much pleased and wished its adoption in the Imperial Army. However, the General Staff at Berlin opposed the idea, basing their objection to the bad showing made by the French Mitrailleuse and the Bavarian "Feld" in the War of 1870.

Another type of machine gun now appeared where the power to operate was obtained by robbing some of the gas from the barrel at the time of discharge, which gas acted on a piston and through a train of mechanism brought about the cycle of firing.

Further development consisted in perfecting mechanical details to eliminate jamming and in decreasing the weight of the gun ammunition and accessories so as to render it more portable and easier of concealment.

The tactical errors of use in the Franco-Prussian War had given the weapon a bad name among the conservative elements in most armies and in consequence the machine gun was deprecated, if not derided, in military essays and textbooks.

An interesting example of this inertia is told by Lieut. Parker in his book "The Gatlings at Santiago." The Ordnance Department had purchased Gatlings using caliber .30 Krag ammunition and had shipped them to Tampa but no organization had been authorized to man them. Lieut. Parker, who saw an opportunity to use them, approached his Colonel, who replied "I don't want to hear anything about it, I don't believe in it and I don't feel like hearing it." Later on the matter came before General Joe Wheeler who was convinced of the value, and as a result the guns went into action in the Santiago Campaign with considerable success.

The three principal objections to machine guns were: (1) That their complicated mechanism rendered their maintenance under field service conditions too difficult. This may be answered that the automobile and other modern conveniences have made the whole world into mechanicians of a sort and that with some special training any intelligent man can take care of a machine gun. (2) The rapid rate of fire greatly complicates the question of ammunition supply. So it does, but the whole question of supply is complicated when compared to the supply problem in "muzzle-loading" wars and if the return from using machine guns is worthwhile, the supply must be attended to. (3) The rapid rate of fire causes men to lose their coolness and waste ammuni-

tion. This objection was raised to breech loaders and again to repeating rifles, but has never been sustained by fact.

IN 1914 the Central Powers were better provided with machine guns than were their opponents and had given more time and thought to perfecting their machine gun personnel. Germany had 50,000 machine guns in 1914 and 75,000 in 1916 despite large losses and proposed to have one machine gun for every twenty men on the front line.

The Austrians at that time had eight machine guns per battalion as compared with two per battalion in the British Army and in the Trentino offensive the Austrians increased the eight to twenty-four.

In regard to France, it is of interest to quote from Devouges' *"L'Avenement des Armes Automatiques"*:

"At the outbreak of the war all the active and reserve Infantry units included both machine gun sections with 2 pieces on packs, and battalions, say in general 6 pieces per regiment, at the disposition of the regimental commander.

"Coördinated action of these pieces was not provided for and the use of machine guns, considered as before as being 'an eventual fire reinforcement,' was so little known to the command that in the first two months of the campaign, chiefs of machine gun sections generally received no orders to engage and acted only according to their own initiative.

"At the time of mobilization, the territorial Infantry units had not yet received their machine guns. In the Cavalry there were per brigade one section of machine guns consisting of 2 pieces on special carts.

"After one year of warfare, and not taking account of the position machine guns and those attached to newly formed organizations, the number of machine guns in service in the French Infantry had been quadrupled.

"In the last months of the year 1915, the issue of machine guns to territorial regiments was then assured by the creation of first one and then two companies of machine guns each with three sections of two pieces."

PREVIOUS to entering the war the American Army had not profited by the lessons taught in Europe and the Infantry regiment had only one platoon of two guns.

In the fall of 1917 the machine gun organization of an A. E. F. Division was as follows: (a) Per regiment of Infantry, one company of machine guns with 12 pieces, on carts, plus 4 pieces in reserve; (b) per brigade, a battalion of machine guns of 4 companies of 12 pieces, on carts; (c) per division, a battalion of machine guns of 2 companies of 12 pieces, carried in light auto-trucks.

All the companies were composed of 6 sections of 2 pieces. The brigade and divisional companies thus gave each division of Infantry a mobile power of 10 companies of machine guns, each regiment retaining its own company.

Devouges gives a table of the portable armament of combatant infantry from the North Sea to the Vosges at the end of the war. The number of divisions does not agree exactly with the number given on General Pershing's War Map now in the National Museum, but the differences are negligible.

Army	Number of Infantry Divisions	Number of Individual Rifles	Number of Heavy Machine Guns	Number of Portable Machine Guns
German	191	1,344,765	25,736	44,736
French	103	648,000	15,592	43,854
Belgian	6	55,000	1,000	3,000
British	57	472,000	4,200	20,000
Italian	2	16,000	240	114
American	23	296,000	5,106	15,550

SINCE the close of the war there has been some discussion of machine guns operated by external mechanical power in the same general way that the earlier ones, such as the Gatlings, were operated by hand power, thus allowing the cartridge to expend its full force in accelerating the projectile. The use of such guns is limited to tanks, airplanes, armored cars or other gun mounts having a power plant. Three such machine guns have been produced in Germany: the Siemens, the Fokker and the Autogen.

It is claimed for this type of gun that less than one horsepower is required to operate the mechanism. The following advantages are also claimed: (a) Very simple construction, since the recoil is not used, the breech mechanism is much simplified; (b) Great rapidity of fire up to 1500 per minute; (c) Reduction of weight; (d) Continuity of fire even if a cartridge fails to explode since it is expelled mechanically.

The claim to reduced weight may be questioned. One statement is that the Siemens gun weighs only about ten pounds. Another statement is that two such guns with their transmission gears weigh 100 pounds.

Another type of machine gun which blossoms annually in the daily press is the one where both the operation and the propelling force are derived from the mechanical power of a gasoline engine or some similar source. Last fall a dispatch from Berlin announced that Europe was astounded with the invention of a Japanese machine gun using centrifugal force to fire 9,075 projectiles per minute absolutely silently. Those who were present at the 1920 meeting of the Army Ordnance Association at Aberdeen will recall the demonstration of a similar gun which was operated by a truck motor and discharged 1200 tempered steel bearing balls per minute. However the range was insufficient.

Eventually some such device may be perfected. At all events it is of interest to compare the available energy in gasoline with that in gunpowder:

	B.T.U. per lb.	Work in Kilogram—Meters
Pure Nitrocellulose	2,000	467,500
Black Powder	1,230	291,100
Gasoline	20,000	4,760,000

The only advantage of the powders is that they liberate their energy almost instantaneously, which the far less expensive and more powerful gasoline fails to do.

Supervision of the Trade in Arms

American Delegation's Report on the International Convention

FOLLOWING is the text of the report on behalf of the American Delegation to the International Conference on the Traffic in Arms, Geneva, 1925, submitted by Hon. Theodore E. Burton, Chairman of the delegation:

WASHINGTON,
December 16, 1925.

The Honorable The
SECRETARY OF STATE,
Washington.

SIR: The undersigned, appointed by the President as Chairman of the American Delegation to the International Conference held at Geneva May 4 to June 17, 1925, to consider the conclusion of a convention for the supervision of the international trade in arms and ammunition and in implements of war, has the honor to submit the following report on behalf of the Delegation, which was composed as follows: Hon. Theodore E. Burton, Chairman; Hon. Hugh S. Gibson, Vice-Chairman; Rear Adm. Andrew T. Long, Mr. Allen W. Dulles, Brig. Gen. Colden L'H Ruggles.

NINE years ago the American Delegation to the International Conference for the Supervision of the International Trade in Arms and Ammunition and in Implements of War submitted this report to the Secretary of State of the United States. The international convention drawn up by the Conference was ratified, with a reservation, by the United States Senate June 15, 1934. The text of the convention was published in the September-October, 1934, issue of ARMY ORDNANCE *(Vol. XV, No. 86, pages 93 to 100). The report, which accompanied the convention, is signed by Hon. Theodore E. Burton, Chairman of the American Delegation to the Conference, and contains a splendid analysis of the problem together with a statement of policy in so far as the interests of the United States are concerned, with which all students of the subject and others interested will agree. It is published here as a supplement to the text of the Convention. The two, taken in their entirety, may be said to represent the reasoned judgment of all who are guided by national defense needs, international coöperation and sound common sense.*—EDITOR.

The delegates of the United States of America, after preliminary conferences held in Washington and at Geneva, met at Geneva on May 4, 1925, with representatives of forty-three other States, including: Germany, Austria, Belgium, Brazil, the British Empire, Canada, the Irish Free State and India, Bulgaria, Chile, China, Colombia, Denmark, Egypt, Spain, Esthonia, Abyssinia, Finland, France, Greece, Hungary, Italy, Japan, Latvia, Lithuania, Luxemburg, Nicaragua, Norway, Panama, the Netherlands, Persia, Poland, Portugal, Rumania, Salvador, Siam, Sweden, Switzerland, the Kingdom of the Serbs, Croats and Slovenes, Czechoslovakia, Turkey, Uruguay and Venezuela.

In the forty-five days of its sessions the Conference drew up a convention to regulate the international trade in arms and war material, a certified copy of which is appended. (See ARMY ORDNANCE, September-October, 1934, Vol. XV, No. 86, pages 93 to 100.) This instrument was signed on behalf of the United States by the Chairman and the Vice-Chairman, and by the representatives of twenty-one other States, as indicated below: Germany (Allemagne),* United States of America, Austria, Brazil, British Empire, India, Chile, Spain (Espagne), Esthonia, Abyssinia (Ethopie), Finland, France, Hungary, Italy, Japan, Latvia, Luxemburg, Poland, Roumania, Salvador, Kingdom of the Serbs, Croats and Slovenes, Czechoslovakia (Tchécoslovaquie).

*The order of signature and of the above list is alphabetical according to the French spelling of each State.

IN the consideration of the work of the American Delegation to the Arms Traffic Conference of Geneva, it is important briefly to indicate the reasons for the holding of this Conference and to outline the preparatory work which served as a basis for the deliberations of the various delegates assembled.

During the Paris Peace Conference of 1918–1919 there was elaborated and signed at Saint Germain-en-Laye on September 10, 1919, by representatives of the United States and by those of twenty-two other Powers a convention to regulate the trade in arms and war material, known as the Saint Germain Convention. This Convention was not submitted to the Senate nor ratified by the United States for the reasons set forth in a communication of September 12, 1923, from the Secretary of State, the Honorable Charles E. Hughes, to the Council of the League of Nations, in replying to a communication from the Acting President of the Council of the League, which quoted a resolution of the Assembly of the League to the effect that:

"The Assembly considers it highly desirable that the Government of the United States should express the objections which it has to formulate to the provisions of the Convention of Saint Germain as well as any proposals which it may care to make as to the way in which these objections can be overcome."

Secretary Hughes in his communication of September 12 stated that "the Government of the United States is in cordial sympathy with efforts suitably to restrict traffic in arms and munitions of war" and referred to the steps taken by the Executive under legislative authorizations of 1898, 1912, and 1922 for the regulation of the trade in war material with other countries in this hemisphere and with countries where the United States exercised extraterritorial jurisdiction. Secretary Hughes pointed out, however, that the Saint Germain Convention, while not undertaking to restrict the purchase of arms by countries signatory thereto, would prohibit such sale to States not parties to the Convention, and that under such provisions this Government might be required to prevent shipments of military supplies to such Latin-American countries as had not signed or adhered to the Convention, however desirable it might be to permit such shipments, merely because they were not signatory powers and might not desire to adhere to the Convention.

The Secretary of State further pointed out that the provi-

sions of the Convention relating to the League of Nations were so intertwined with the whole Convention as to make it impracticable for this Government to ratify, in view of the fact that it is not a member of the League of Nations.

In acknowledging Secretary Hughes' communication the Acting President of the Council of the League of Nations, on December 14, inquired whether the Government of the United States, having indicated that it was "in cordial sympathy with efforts to restrict traffic in arms and munitions of war" was prepared to coöperate with the Temporary Mixed Commission, the organ of the League which then was considering questions of disarmament, in the preparation of a draft convention, or conventions, for the purpose of controlling this trade.

This inquiry having been answered in the affirmative, the American Minister to Switzerland, Mr. Grew, and later Mr. Gibson, met informally with the Temporary Mixed Commission of the League of Nations, which drew up a draft of a convention for the control of the international trade in arms which was intended as a basis for the consideration of this subject by an international conference which it was proposed later to convoke. The documentary material covering these preliminary conversations which were held at Geneva and Paris in February, March and July, 1924, is fully set forth in the appended publication (Annex 1). (Editor's Note: This and other annexes are not republished here.)

SUBSEQUENTLY, the Council of the League of Nations on October 7th communicated to the Secretary of State an invitation to attend the International Conference in question. The text of this invitation is quoted herewith:

"SIR, At its meeting held on September 30th, the Council adopted the following Resolution:—

" 'On the proposal of the Assembly the Council decides to authorize the Secretary-General to submit to the Governments of the States Members and non-Members of the League of Nations the draft Convention relating to the Control of the International Trade in Arms, Munitions and Implements of War drawn up by the Temporary Mixed Commission, and to request these Governments to inform him, before the Council meets in December, whether they are prepared to take part in a Conference to be convened in April or May, 1925, for the purpose of discussing the draft Convention.

" 'The Secretary-General will communicate to the various Governments the report of the Temporary Mixed Commission, the minutes of that Commission and the minutes of the Permanent Advisory Commission relating to the discussion of Article 9, together with the minutes of the present meeting of the Council, in order that the representatives of the Governments on the International Conference may have the requisite information to enable them to come to a decision on the problems raised on this question during the present meeting.'

"In execution of this decision, I have the honour to enclose herewith the draft Convention on the control of the International Trade in Arms, Munitions and Implements of War which was drawn up by the Temporary Mixed Commission (Document A 16. 1924 IX. Annex IV).

"The next meeting of the Council is to be held on December 8th, 1924, and I should be grateful if you would kindly inform me, if possible before that date, whether the United States Government would be prepared to take part in an International Conference to be held in April or May, 1925, for the purpose of discussing this draft and concluding a Convention on the control of the International Trade in Arms, Munitions and Implements of War. The exact date of this Conference will be fixed by the Council at its December session.

"In accordance with paragraph 2 of the Council's Resolution I am also enclosing herewith the report of the Temporary Mixed Commission for the reduction of armaments and the report of the 3rd Committee of the Assembly.

"The report of the Temporary Mixed Commission contains that part of the Minutes of the Commission which relates to Article 9 (Document A 16. 1924 IX. Annex V).

"Further information relating to the preparations for the Conference will be forwarded to you as soon as possible.

"I have the honour, etc.

(signed) ERIC DRUMMOND, *Secretary-General.*"

To the foregoing communication the following reply was made, on December 7, by the American representative in Switzerland under instructions from the Department of State:

"I beg to inform you that I have been instructed by my Government to acknowledge the receipt of your communication of October 7, 1924, transmitting the text of a resolution adopted by the Council of the League of Nations with respect to the holding of an international conference of the States members and non-members of the League of Nations April or May, 1925, for the purpose of considering the conclusion of a convention with respect to the international trade in arms, munitions and implements of war. In this communication you inquire whether my Government would be prepared to take part in such a conference.

"In reply I take pleasure in referring to the communication addressed to you on August 29 in which it was stated that my Government would be disposed to give favorable consideration to an invitation to participate in an appropriate international conference of the powers for the aforementioned purpose. My Government still holds this attitude and is agreeable to the suggestion that the time of holding the Conference should be in April or May, 1925."

THE attitude of the American Government toward the control of traffic in arms and the program and policy of the American Delegation was clearly set forth in the following statement of the Chairman of the American Delegation, of May 5, the day after the opening of the Conference:

"In accepting the invitation to be represented at this Conference, the Government of the United States cordially welcomes the opportunity to collaborate in the present movement. The people of the United States earnestly desire to give substantial evidence of their sincere interest in aiding in any constructive effort directed toward the maintenance of peace, and it is hoped that such efforts will be promoted by the proper control of the international trade in arms through the suppression of illicit trade in war material and by securing the fullest and most accurate publicity as to the extent and character of this trade. It is with this intention and with this spirit that the American Delegation will take part in the discussions of the Conference, in the hope of contributing towards attaining concrete results.

"As an evidence of our sincere desire to contribute to the inauguration of an era of continuing peace and to aid in preventing the horrors of war, the Government of the United States, in 1921, took steps to convene the Washington Con-

ference, the results of which are known to the world. In addition to the definite achievements of this Conference, it is believed that the spirit which actuated the delegates at that meeting was a striking indication of the intent of the Powers participating to continue the work initiated there.

"As regards the specific object of the present Conference, namely the control of the traffic in arms, our Government has in recent years followed the policy of counseling its nationals against engaging in such trade with the troubled areas of the world where military arms might be particularly used for purposes of disturbing the peace. Further, under the authority of existing legislation, our Presidents have, from time to time, imposed absolute or partial restrictions on the exportation of arms from the United States to certain areas where such measures appeared to be particularly necessary. In addition, the flotation of foreign loans in the United States for the purpose of purchasing armament has been consistently and, it is believed successfully, discouraged.

"Our part in the international trade in arms has not been large during the past few years, and the policy of the Government, already outlined, has helped to keep it within proper channels. But our Government is glad to be able to coöperate with other Powers in an effort to secure precision and uniformity in the measure and manner of control.

"In the forthcoming discussions of the Draft Convention which has been placed before the Conference as a basis for its deliberations, we shall offer certain constructive suggestions and modifications which, it is felt, might appropriately be embodied in the proposed Convention and which might assist in achieving the objects of the Conference. One of the most important of these suggestions, which I shall present in detail on a more appropriate occasion, concerns additional measures to deal with the traffic in poisonous gases with the hope of reducing the barbarity of modern warfare.

"The Delegation of the United States realizes that it is important to consider the problem of the traffic in arms not only from the point of view of the producing but from that of the non-producing States. No program has yet been adopted which is effective for general disarmament and it is clear that the trade in arms cannot be eliminated. Nevertheless a solution may be reached which will assure to sovereign States the means of securing what may be necessary to their national defense and the maintenance of internal peace and order and which will, at the same time, properly control the international trade in arms.

"I desire to express my appreciation of the excellent remarks of M. Dupriez and I also wish to express my thanks to M. Matsuda for his expression of friendship to the United States. Let that expression be indicative of the mutual confidence and good will which should exist between the two nations on either side of the Great Pacific—Japan and the United States of America.

"In conclusion, let me say that it is with optimism that we enter upon the work of this gathering, in the hope that by friendly consultation something may be accomplished worthy of the best efforts of the delegates here assembled and which may substantially promote the cause of peace."

THE details respecting the organization of the Conference, the questions considered, the positions taken by the various delegates, together with the proceedings of the various committees and subcommittees, are fully set forth in the attached publication (Annex 2). While it is therefore unnecessary, and would only result in repetition, to review the entire work of the Conference in this statement, a brief indication of the scope of the Convention, of the special problems met by the Conference, and of the American interests involved may not be out of place.

(1) In Articles 1 to 5 of the Convention provision is made for the supervision of the international trade in arms, munitions and implements of war with a view to keeping such trade within the proper channels. This control of the trade is to be exercised by each sovereign state within its own territory according to its own laws enacted or to be enacted to make the Convention effective.

(2) A system of publicity is provided for the international trade in the implements of war comprised in Categories One and Two, that is,—arms exclusively designed for war and those susceptible of use both in war and for peaceful purposes. Provision is also made for publicity for the trade in aircraft and aircraft engines and for publicity of the most detailed character in connection with the sale or transfer of any vessel of war.

(3) Provision is made for special control with regard to the shipment to, and the disposition of arms within, certain areas of the world where, experience has shown, there is particular need for close supervision of the arms traffic. These areas include Central Africa and the territory formerly a part of the Ottoman Empire but now detached from Turkey as defined in Article 12 of the Convention.

During the deliberations of the Conference, certain special problems arose which merit brief explanations.

(1) The Conference recognized that the trade in war vessels could not, from its nature and the place of such vessels in international law, be dealt with on the same basis as trade in rifles or ammunition. With a view to meeting this situation, the American Delegation proposed and found ready acceptance for the suggestion that the regime outlined in Article XVI of the Washington Treaty of February 6, 1922, limiting naval armament, should be adopted. According to this regime as outlined in Article 7 of the Convention, the High Contracting Powers undertake to supply full information with regard to the construction within their territory of a ship of war for delivery to any foreign Power.

(2) The problem which the Conference had to face with respect to the trade in airplanes was of a slightly different character in view of the recognized commercial uses of airplanes, as well as the practical difficulty of distinguishing between an airplane adapted for war purposes and an airplane adapted for the ends of peace. It was felt, therefore, that a provision (Article 9) stipulating that full publicity should be given to the foreign trade in aircraft and aircraft engines would meet the situation, without interfering with legitimate commerce.

(3) At an early stage in the Conference it became clear that the States bordering on Russia had a special problem to face in connection with the publicity of their military purchases. The Soviet regime declined to be represented at the Geneva Conference and has indicated no interest whatever in adherence to the Arms Traffic Convention. The States bordering on Russia represented at the Conference are for the most part States which are dependent upon imports for the supply of the military equipment which they consider necessary for their national defense. The border States considered that an obligation on their part to publish full statistics

of their importations while Russia was under no obligation to give similar publicity to its importation would be detrimental. For this reason therefore, the Conference agreed to incorporate in the Treaty a provision (Article 29) freeing certain States bordering on Russia from the obligation of publicity pending the adhesion of Russia to the Convention.

(4) Throughout the Conference the delegates of the so-called "Producing States" were constantly reminded that the problem which the Non-Producing States had to face was of a different character than that of the Producing States and that the former could not properly acquiesce in any treaty provisions which would prejudice their right to secure the arms necessary for their national defense. In considering this situation the American Delegation was also impressed by the fact that any regime of control which restricted the right of the Non-producing Powers to purchase arms abroad might have the unfortunate result of forcing States at present non-producers of arms to introduce on a large scale the manufacture of arms and war material. Many a State might thus become more or less of an armed camp and the result would be detrimental to the cause of peace. Therefore, there have been introduced into the Convention no provisions which prevent a State from securing arms for its national defense from other countries under certain safeguards and guarantees and with the publicity which should act as a preventative against the undue accumulation of imported arms in any given country.

(5) It was brought to the attention of the Conference that in States where extraterritorial rights were exercised there would be obvious difficulties in enforcing the provisions of the Convention as against foreigners enjoying such extraterritorial rights. This situation unless corrected might result in opening to foreigners, enjoying extraterritorial privileges in certain countries, the opportunity of engaging uncontrolled in an illicit trade. For these reasons Article 30 was included in the Convention, according to which the "High Contracting Parties who possess extraterritorial jurisdiction in the territory of another State party to the present Convention undertake in cases where the rules of this Convention cannot be enforced by the local courts as regards their nationals in such territory to prohibit all action by such nationals contrary to the provisions of the present Convention."

(6) The question of the control of the trade in arms in time of war presented a particularly difficult problem. It is a recognized principle of international law that a neutral State is under no obligation to prevent the shipment of arms from its territory on behalf of a belligerent; provided, of course, as specified in the laws of the United States, that the territory of the neutral State shall not be used as a base for fitting out military expeditions. On the other hand, it is contrary to the obligations of neutrality, as recognized in the laws of the United States as well as in the law and practice of nations, for a State itself either directly or indirectly, to supply arms to a belligerent. Under the regime outlined in the Convention the approval of the Government of the exporting country is normally required in the case of the shipment of arms in Category One. If such approval were also required in time of war the neutrality of a power formally approving the shipment of arms to a belligerent might be called in question. If therefore the Convention were applicable in its entirety in time of war, the result might be that it would be rendered impossible to permit shipments of arms to a belligerent although such shipment might otherwise be unobjectionable, and although the country in question might not desire to intervene to prevent shipments.

In view of these considerations it was the unanimous opinion of the delegates assembled that it would be unwise to endeavor to apply with respect to belligerents the articles of the Convention which involved the approval of the exporting government as a necessary prerequisite to a shipment. Consequently the following article (Article 33) was introduced into the Convention.

"In time of war and without prejudice to the rules of neutrality the provisions of Chapter 2 shall be suspended from operation until the restoration of peace so far as concerns any consignment of arms or ammunition or implements of war to or on behalf of a belligerent."

AMERICAN interests involved: (1) The United States has for some time given full publicity to the statistics of its foreign trade, including publicity of its trade in war material. The American Delegation therefore felt that it would be according to American traditions of publicity and frankness to agree to continue such publicity and that it would be in our interest that other countries should likewise make public their trade in arms.

(2) The method of supervision provided for in the Convention for the trade in arms is adapted to meet the special conditions existing in the United States. In particular it should be noted that the forms now used for export declarations are specifically recognized in the Convention and it is provided that these forms may, under certain safeguards, be employed to secure the requisite control and publicity. Thus the necessity for the creation of elaborate boards of control for the issuing of licenses in individual cases of shipments of arms is obviated.

(3) The Convention does not provide for the control of the international trade in arms by any international body. Each country is to exercise its control within its own jurisdiction and according to its own laws, without dictation, advice or interference by any international commission.

(4) In connection with the provision for the enforcement of a strict control of the arm trade within certain areas of Africa and Asia, the American Delegation, while recognizing the reasons for such a control and agreeing that shipments from the United States to the areas in question should be under strict supervision as far as their clearance from the United States was concerned, proposed and secured the insertion in the Convention, in Article 27, of a provision that would relieve the United States from any responsibility with respect to the application of this regime in territorial or maritime zones beyond the jurisdiction of the United States.

(5) The present Convention, superseding as it would the applicable provisions of the Brussels Act of 1890 and the unratified Saint Germain Convention, helps to clarify the situation and defines the conditions under which arms shipments from this country may properly be permitted. Its provisions would in no way conflict with the control which may now be exercised with respect to the export of arms to certain countries under existing provisions of American law.

THE delegates at the Conference impressed upon the American Delegation their view that any international convention for the control of the trade in arms would be ineffective unless adhered to by the United States, one of the important arms producing powers. With a view to facilitating Amer-

ican adherence, the Conference did not press for the inclusion of any provision for the supervision or control of the arms trade by an international commission, recognizing that such control would be inacceptable to this Government. Further, the various proposals advanced from time to time by the American Delegation received the full and sympathetic consideration of the Conference and in every case where American principles and interests were involved, solutions which the American Delegation considered acceptable were adopted. The American Delegation desire to record their recognition of this attitude and, in submitting this treaty, to state that in their opinion the success or failure of the entire Convention will be in no small measure dependent upon the attitude assumed by the American Government in the matter.

While registering this view, the American Delegation would point out that in their opinion the adherence of all the important arms-producing powers, and not only that of the United States, is essential to the realization of the objects of the Convention. For the United States to ratify and to make the Convention effective prior to the ratification by other arms-producing powers would only result in placing a premium upon non-ratification by certain producing powers, since they would then be free to sell arms to other powers without control and without publicity. If, therefore, the Convention meets with the approval of the Senate, and if the legislation which will be necessary to make it effective in the United States is assured, the delegates of the United States consider that the deposit of ratifications on the part of the United States should be conditioned upon the deposit of ratifications by the other great producing powers of the world. The American Delegation would not of course suggest any delay in the submission of the Convention to the Senate or its consideration by that body, but considers that in the event of Senatorial approval the deposit of ratifications, which would make the Convention binding upon the United States if thirteen other Powers deposit ratifications, should only take place when among the ratifying powers are included the other principal arms producing States.

The American Delegation appreciates that the present Convention does not specifically provide for any restriction in the volume of the trade in arms, although the control of this trade should indirectly result in such restriction through the reduction of the illicit traffic in war material. It is felt, however, that pending the realization of a definite disarmament program it would be futile, and possibly harmful, as indicated above, to attempt the arbitrary restriction of the trade in war material, which would place the non-producing powers at the mercy of the producing power, force production by all powers and, far from accomplishing the purposes of disarmament, might tend toward the increase of the military establishment of certain powers.

In addition to the Convention itself, there is also appended (Annex 3) a copy of the Protocol of signature and a copy of the Final Act (Annex 4) which describes the calling of the Conference and includes two declarations of the delegates assembled. Neither of these documents calls for ratification. In addition, there was signed at Geneva a declaration relating to the inclusion of the territory of Ifni (in Spanish Morocco) in the special zones. This declaration was not signed on behalf of the United States, and it is not felt that it calls for action at this time on the part of this Government.

In conclusion, the American Delegation desire to express their appreciation of the invaluable assistance rendered by the Secretary of the American Delegation, Mr. Alan F. Winslow, and by the Technical Advisers, Mr. Charles E. Herring, Commercial Attaché at the Embassy in Berlin, Major George V. Strong and Major Earl J. Atkisson of the War Department, and Commander Herbert F. Leary, Assistant Naval Attaché at the Embassy in London.

The Delegation also take this occasion to record their appreciation of the effective and impartial manner in which the proceedings of the Conference were directed by its President, M. Carton de Wiart, former Prime Minister of Belgium, and in the latter's absence, by the Vice President of the Conference, Mr. Guerrero, of Salvador. The Delegation also desire to pay tribute to the efficient services rendered by the Secretary-General of the Conference, M. Madariaga, and by the other members of the Secretariat General of the Conference.

Respectfully submitted,

(signed) Theodore E. Burton.

The U. S. S. Saratoga, Naval Airplane Carrier, Passing Through Gatun Locks, Panama Canal, October 27, 1934.

Democracy and the General

Public Policy and the Art of Command

By John M. Erwin*

INDISSOLUBLY should the two be wedded until death puts them asunder. And inevitably when a true union of politics and military command languishes, disaster is the result. The word "politics" is used in its broadest sense which includes international as well as national affairs; statesmanship might be a more vivid term, but it is not so familiar to our every-day usage as politics, which leaves nothing to the imagination. Praise of this seemingly unholy match might appear to be a repudiation of all the painful lessons of history. The structure of modern governments shows that an enormous amount of thought and effort has been directed toward keeping the military clear of politics; and rightly so, since soldiers who individually or collectively busy themselves with these matters invariably bring about deplorable conditions and endless human misery. God forbid such meddling! However, in war, the army whose commander profoundly understands his civil masters, their virtues and peculiarities, their problems and their aims—that fortunate army will find its task not insurmountable and its sacrifices will turn out to be within reason. Since the opening of the nineteenth century we have been treated to a display of commanders ranging from the extreme of the politician in uniform to the type of honest soldier who fastidiously avoided all non-military affairs. The evidence has been presented; the spectators in the court have grown bored and irritated with the occasional sulky and capricious lapses of Dame Command. Cheers greet the stern admonishment of the judge, who denies her plea for separate maintenance and orders her to return to her lord and master, Politics, and to serve him dutifully with understanding and becoming modesty.

When a situation develops unmanageable tendencies, the people's leaders call upon their fighting men to carry out the nation's policy. Until then the proper role of the military has been to observe warily but to keep its fingers off the board. The order to act comes suddenly and the commander then finds that he is supposed to be something more than the sturdy warrior. The brief instructions he receives are rarely illuminating, witness Kitchener's directions to Sir John French in August, 1914; the plans presented by the General Staff have aged at the same rate as their authors (even Joffre longed for an opportunity to change Plan XVII); the military needs of the moment will rarely have been provided. Unless the mind of the commander has been trained to perceive these things in the light of a sound knowledge of national and international affairs, unless he is capable of creating a strong bond of sympathy and understanding between himself and his civilian superiors, he will take up his duties under a load of misapprehension and doubt that will give him little opportunity to pursue success.

IN the great democracies of recent history, the ultimate responsibility for the conduct of war has lain ponderously upon the shoulders of the politicians. The president or prime minister finds a general to do his bidding, and thereafter the fortunes of the two are fatefully linked. An indolent government may wreck the general's prospects, or a defeat in the field may undermine the administration. In any event, it is a lucky government that discovers a commander who understands the political as well as the military problem. Such a man was Grant: he knew that the politicians wanted protection, he also knew that the public demanded action, and he provided both. Later, before Richmond, he waited while Sherman performed a maneuver very necessary to the military accomplishment, and the people thus diverted were content to wait a little longer for the price of a complete victory.

Many points of similarity can be found between Grant and Joffre, their magnificent silences, their physical activity, their resolution and astounding tenacity, and it is doubtful if the French Commander-in-Chief can be reproached with having neglected his political responsibilities. Nevertheless it is interesting to note that some astute politician prevented Joffre from violating Belgian neutrality before the British declared war in August, 1914. What a blunder that would have been! And what a mess for the British Cabinet to unscramble when the question of their intervention came up for decision! But they were spared this extra series of headaches. Perhaps the military situation seemed to require a quick advance across Belgian territory. It appeared so to General von Moltke. But French politics placed such action definitely beyond the pale of consideration. German politics were not sufficiently developed to exert this power, and the German commander was thinking of victory, not of politics.

History abounds in examples of the political failures of commanders, and contains a number of interesting successes as well. Hannibal's politics left him stranded in Italy; Napoleon's continental entanglements rushed him into Waterloo; McClellan's wrong appreciation of political values lost him a great reputation; Lee, had he considered more deeply the political situation, might have used his great prestige to bring about a unified Confederate command at an early period in the Civil War, which would have given the North a much harder nut to crack. On the other hand, Kitchener, who claimed to be no politician, won a campaign and a great name on a limited budget during an economy administration; Washington sat down in Morristown and waited until international politics had done their work on eighteenth century England; Pershing set his jaw and, to the consternation of his more devious colleagues, banged the council table with his fist while he built up the army which he knew his nation expected; Jellicoe nursed his precious battleships and prevented a German triumph. Such men were not dabblers in politics, but they knew what the politicians were doing, and primarily they knew what their people wanted. . . . Caesar? . . . Cromwell?—These were politicians turned generals with talent enough to become Great Captains. Under modern conditions administration officials have quite enough to do without taking the field, even the ablest will be taxed. And the politically minded commander should never be a politician—deliver us!

*Military Personnel Division, Office of the Chief of Ordnance. Captain, Ordnance Department, U. S. Army.

Signal Corps, U. S. Army

President Wilson, General Pershing and Party at Chaumont, December 25, 1918.

MILITARY commanders are not always grateful for the guiding hand of the politician, indeed the cry against civilian interference in the World War still echoes in the British public press, and there is much justice in this feeling of the army. To the professional soldier, weighted down with immense responsibility and convinced of the accuracy of his views, the seemingly ill considered offerings of the amateur, especially when the latter is backed by the authority of high office, are intolerable. Does the local police commissioner instruct the physician how and when to administer a physic? Even a house owner is tactfully careful in the presence of a hastily summoned plumber. Not so with the military; the passing drums and fifes arouse in every man the conviction that he has a rather surprising bent in the field of strategy. It is a marvel how President Wilson and Mr. Baker managed to keep out of the actual strife; noble characteristics in each of them are recognized, but among the noblest was their exemplary restraint. Interference from the side lines calls for a mighty display of understanding and tact on the part of the commander. Civilian interference in the last war may have been irksome, but the views of a strong leader, backed by the votes of a large majority, cannot be ignored. It is interesting to note how enviously General Ludendorff regarded the manifestations of this power in France and Great Britain. Before the end he longed for a chancellor like Clemenceau or Lloyd George with the nation under his thumb.

All of which discussion takes us somewhat deviously not anywhere in particular. For reasons of public morals and safety the soldier is at liberty to practice his profession only for one or two short periods in his lifetime. If he accept the hypothesis expressed above, it only adds to his difficulty; he is to understand politics, but he is not to engage in them. His only solution and refuge is history.

The military student of history should not confine himself to a succession of wars and campaigns, but he should plunge into an investigation of all the principal warlike peoples, their civilizations, their governments, their economics, their traditions, their national aspirations. Unfortunately, like most pursuits on the field of battle, the pursuit of historical truth is laborious in the extreme. Published documents in the main are biased, fragmentary and sometimes readable; original records are incomplete, faulty and heavy going. A man cannot afford to spend his life among them. His salvation is to develop a faculty of guessing that will not lead him into too many errors. Whether or not his details are accurate is immaterial, his conclusions are what count, and thereby his military and political judgment is rounded off and polished. Colonel Lawrence is quoted as having said, "A commander should know everything," which brings to mind W. S. Gilbert's versatile Major General in "The Pirates of Penzance," but when the time comes it is doubtful if such a phenomenon will be supplied. However a properly constituted staff always has bright young officers who are anxious to advance "—many cheerful facts about the square on the hypotenuse," and political advisers at headquarters are not unknown in the history of war, but it is safer that political sagacity be deeply rooted in the mind of the commander himself. He will serve his nation well if he understands his own soul, human nature, and the wants of his people.

War — Grim War!

Termite Control at an Ordnance Storage Depot

By S. P. Meek*

FIRST get a picture of the termite queen—the ultra-prolific breeder, and you have an idea of the source of the problem. She is in the royal cell. Over her and around her swarm dozens of her diminutive subjects, nymphs, workers and soldiers, busily engaged in feeding her, grooming her, and above all, in licking her massive body, for she exudes a sweet, sticky substance which her subjects find especially tasty. So energetic are they in their attentions, that at times they even lick holes in the thin skin of her body.

She is incapable of locomotion. Time was when she had been a slim and graceful princess. That was when she had grown wings and made her one and only flight, lasting but a few hours. Then her lacy wings broke off at the base, leaving only a persistent wingstub which still showed, and, her flight over, she fell to earth. There she found a male who had accompanied her on her flight from the old colony, and the pair had dug a tunnel into the ground, hollowed out a royal chamber, and mated. For a time they cared for the newly hatched nymphs, until enough of their progeny had grown into workers to take over the labor of the colony. Others of the nymphs had developed into soldiers with hard horny heads and heavy mandible nippers, the protectors of the colony from their inveterate enemies, the ants.

From a tiny insect only a quarter of an inch or so in length, she had grown to Gargantuan proportions. The front part of her body, the head and legs, had grown not at all and still matched her old tiny body. But the body itself had grown until it was over two inches long and as large around as a man's little finger. There was need for this size, for she could lay 4,000 eggs a day; millions during her ten years of life. Her first and only husband had not grown, and was still her original size, or slightly smaller; he is the only true male in the colony. The nymphs would in time mature, some into neuter workers; soft-bodied blind things with nippers fit only for cutting into wood; some into huge headed, horny jawed soldiers who could block a broken tunnel with their heads while their jaws seized individual invaders and crushed them, and some few into fully developed males and females as had the queen and her husband. Then they would leave the old colony and fly, forgetting for a time their fear and hatred of light and reverting to their ancestral love of it. For part of a night they would fly, then their wings would break off and they would fall to earth, to mate and found new colonies as this queen in her time had done.

BUT Fate struck! There was a thudding sound, and a heavy iron rod crashed into the nest, perilously close to the royal cell's sacred precincts. The rod was withdrawn and the hateful light streamed in. There was a rush of soldiers to block the opening with their heads until the workers could laboriously bring, one at a time, the needed particles of earth and cement them into a concrete-hard mass, and repair the damage. But there was no time for this. Another piece of iron, this time a pipe, crashed into the earth, and down its hollow length came a flood of yellow liquid. It turned into a heavy, evil-smelling vapor, a vapor which choked the queen and threw her into agony. The nymphs, soldiers and workers tried to flee the torment, but the queen was powerless to move her huge bulk. The king himself was more than willing to abandon his queen, but the vapor made him incapable of locomotion. On all sides her subjects were curling up in death, and not alone in the royal chamber. In the connecting galleries they were succumbing by the hundreds and thousands. Just before she died, there was a rumbling sound like distant thunder. To the human ear it shaped itself into words.

"Well, Sergeant, I reckon we fixed that colony."

"I doubt it," replied a tired voice. "Can't expect to get that big a nest with one shot of carbon disulphide. Drive in a control stake and we'll lift it in a couple of months and see how good a job we did. Let's hunt another nest."

"Okay, Sergeant," replied the first voice. "This is a steady job, all right. Say, I'm glad of one thing, I didn't enlist for the duration of the war. If I had, I wouldn't have had a life job, I'd have had one for all eternity."

The termite control squad moved on, leaving behind them a wrecked colony of ground-nesting termites, one in which they hoped that they had been lucky enough to exterminate every member. For it is war, grim war that they are waging, a war without mercy or quarter, a war to the death, a war of extermination. It is war on a wideflung battle front, for not only in Hawaii, but in practically every corps area on the Mainland, not to mention Panama and the Philippines, scenes like the one described are happening daily. It is war without glory, without medals, without pomp or panopoly, but it is deadly war notwithstanding, for billions of lives are lost and millions of dollars worth of property are destroyed annually.

In the one army stands man, man with his fertile brain, his facile hands, and every weapon his genius can fashion. In the other stands the termite hordes with only two weapons, the enormous fertility of their queens, and the voracious appetites of their workers. Yet, with these two weapons, the termites are slowly winning victory after victory, for the termite ravages are spreading.

STILL, the picture is not entirely a gloomy one. Man has really only begun to fight. New methods of warfare are being developed as the problem is studied, and some day the battle line will become stationary. In time it may even turn, and man will begin to win back the ground he has lost in the last decades.

Termites are frequently called "white ants," but since they are neither white nor ants, the term is a misnomer. However, it is one that is likely to stick, despite the learned pronouncements of entomologists and the dicta of termite-control bodies. Entomologically speaking, the termite is more nearly allied to the cockroach than to the ant. They have, however, been distinct from the cockroach for millions of years, for fossil termites of the very types that are now doing damage in the United States have been found in deposits known to be over

*Hawaiian Ordnance Depot, Honolulu, T. H. Captain, Ordnance Department, U. S. Army.

a million years old. It is probable that the termites were on the scene long before man even appeared, let alone stepped into the role of an enemy.

There are over 1,200 known species of termites, ranging from the highly developed species of Africa and Australia who build nests with entrance mounds twenty or more feet

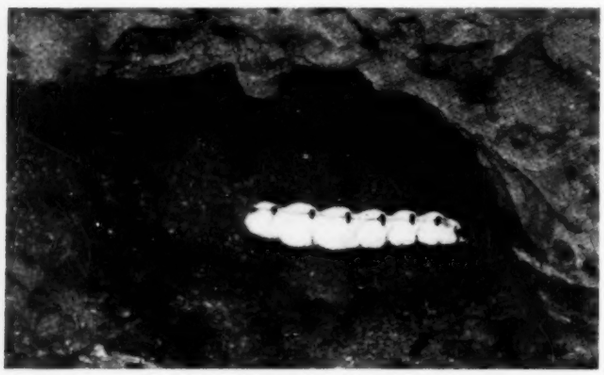


Fig. 1. The Ground Nesting Termite Queen.

high, to the weak, soldierless varieties, who can exist only as guests in the termitaria of the stronger and more specialized species. However, there are only about forty of these species known in the United States, and only four of any economic importance are found in Hawaii. Of these four, two species, the ground-nesting or soil termites, and the dry-wood nesting termites, constitute the real problem.

No statistics are available giving the annual loss of property due to termite ravages in Hawaii, but it is safe to say that this runs into hundreds of thousands of dollars annually. In the last two years, in the Hawaiian Ordnance Depot alone, it has been necessary to repack and recondition 25,000 rounds of 3-inch shell, to mention only one item, while thousands of boxes of small arms ammunition have been processed to free them from termites and to prevent the reëntry of the insects. In addition to this, the bins in the general property warehouse are so badly infested with the dry-wood nesting type that it is no longer safe to send men up onto some of them. It is only a matter of two or three years at the most when these bins will have to be torn out and replaced with steel binning at an estimated cost of over $15,000. Two of the three sets of officer's quarters are badly infested, and keeping them out of the company barracks and the administration buildings and warehouses necessitates constant surveillance and unremitting effort and attention.

Nor is it only in the old buildings that they are prevalent. In the newest installation in Hawaii, the Aliamanu Storage Project, they have already made their appearance and at the present time (September, 1933) bids have been invited for the gassing of certain galleries containing bombs and ammunition in wooden crates in order to eliminate the first manifestations and to prevent their spread into the balance of the wooden boxed and crated material.

Of the two important types, the soil-nesting termites do the most damage in the shortest time, but they are, luckily, the easier of the two to detect and control. Moisture is essential to their life, and so they are forced to nest in the ground. From their underground nest they construct tunnels or runways leading to their only food, wood. These tunnels are made of particles of earth, cemented together with feces. Each particle of earth is carried laboriously to the scene and cemented into place by a worker. It would seem to be a slow process, but so numerous are the workers in an established colony that tunnels twenty feet long are constructed in a single night. Due to their hatred of the light, most of their building operations are conducted at night and on the approach of day, the end of the tunnel is sealed off until another night brings renewed activity.

These tunnels will be found along the face of concrete foundations, up trees, up posts, on anything that will support them. They resemble a heavily insulated electric light wire in appearance and are not difficult of detection. Provided that an exhaustive daily inspection of all material in storage at the Hawaiian Ordnance Depot could be made, probably each attack could be detected and checked before any damage was done, but unfortunately such an inspection would require many times the personnel available for all type of work in the property division.

Once the characteristic tunnels are found, the termite control squad is promptly notified. They trace down the tunnels to earth to locate the nests, drive in an iron stake to a depth of two feet, replace the stake with an iron pipe, and inject carbon disulphide into the ground, not only at the point where they think the nest is, but all around it at three foot intervals. A control stake is then driven into the ground and removed at intervals of two months for a year, until the control squad is certain that the colony has been exterminated. If the control stake is found to be infested, Paris green is injected into the hole where the stake was, as well as the ground treatment with carbon disulphide. As a final treatment, Paris green is injected with a dust gun into the infected wood, and into all tunnels and runways that can be found.

The carbon disulphide is, of course, a lethal gas, while the use of Paris green, or some other form of arsenic, is based upon the fact that all termites exude a sweet sticky substance which their mates find very palatable. This exudate, being moist, will cause the arsenical preparation to adhere to the insects, and the incessant grooming or licking of one another's bodies insures the rapid dissemination of the poison throughout the colony.

The quick and enormous damage done by the soil-nesting termites is due primarily to the enormous fecundity of their highly specialized queens, who soon form a colony of many thousands, most of whom are neuter workers. These workers

Fig. 2. Damage Done by Ground Nesting Termites. Skeleton Remains of Part of Wooden Beam Containing a Nest Shown in Fig. 3.

are blessed with enormous appetites, and are inflicted with a protozoa parasite which enables them to digest cellulose. They will quickly build tunnels on any available support to the nearest wood, and once they have entered, they eat it out with appalling rapidity. The beam or board is unchanged in out-

ward appearance, for they leave a thin skin of wood to protect them from the light. The inside, however, will soon be entirely destroyed, being honeycombed with thousands of galleries, following the soft heart or sap wood. Even without supports, they can reach wood, for tunnels have been found, raised vertically from the earth without support other than themselves, to a height of over three feet. However, their tunnels can be readily recognized, even by an inexperienced termite man, and once found, the nests can usually be located easily and destroyed.

THE dry-wood nesting termites present a somewhat different problem. They have no worker caste, the labor of the colony being performed entirely by the nymphs or young. Since these nymphs are constantly developing into kings, queens, and soldiers, sprouting wings and flying away, the scarcity of labor forces a measure of birth control on the queens. The queens are not enormous layers, and it is unusual to find a nest of dry-wood nesting termites numbering more than a few hundred individuals, but there may be dozens of colonies in a single piece of lumber.

They do their damage at a much slower rate, but they are more of a menace and harder to control, for they leave no telltale tunnels by which they can be traced. A mated pair, following their short-lived flight, bore a small hole into wood, which hole they quickly seal or plug up, leaving a scar which can be detected only on very close examination.

Here they breed and produce nymphs which serve as workers of the colony until they mature and sally forth to found new colonies. Like the soil-nesting species, they prefer the softer heart wood, and will completely riddle a timber which is, to all outward appearance, sound. They are usually detected either by prodding the wood with a sharp instrument like an ice-pick, or by the characteristic droppings which they leave on the ground when they bore a hole in wood,

FIG. 3. DAMAGE DONE BY GROUND NESTING TERMITES. A NEST TAKEN FROM THE END OF AN INFESTED BEAM.

either to enter and found a colony, or to leave the old colony for their nuptial flight. Once this evidence is found, a close examination will reveal the plugged hole of entrance, and steps can be taken to eradicate them.

Since this variety has the same licking or grooming characteristic as the soil-nesting variety, the injection of Paris green, or other arsenical preparation, into the runways is very effective, provided that every colony is treated. This method is used where the infestation is in a floor, a joist, a rafter, or other wood which cannot be removed from place for treatment.

Where the infestation is in a box, crate, or other movable object, fumigation is the better method of eradicating them. The infected wood is removed to a gas house, a concrete

FIG. 4. DAMAGE DONE BY DRY-WOOD NESTING TERMITES. A BOOK FROM THE DEPARTMENT HEADQUARTERS LIBRARY, FORT SHAFTER, T. H.

building which can be hermetically sealed, and carbon disulphide at the rate of one pound per hundred cubic feet of space is introduced. At the end of 72 hours the wood will be full of dead termites and sterile eggs, but free from living ones.

Cyanogas (a commercial preparation of cyanide of calcium which liberates cyanogen readily) is another agent much used, although both cyanogen and hydrocyanic acid gas are somewhat inferior to carbon disulphide for effectiveness. However, cyanogan or some similar lethal agent is to be preferred where live ammunition is to be gassed in place in a magazine or warehouse, because of the extreme fire hazard connected with carbon disulphide.

Following the gashouse treatment, the boxes or crates are creosoted with a hot brush treatment, a method which will be considered at greater length under the head of preventive measures.

So far, this article has dealt entirely with methods of eradicating termites, once material has become infested with them. There is an old adage which says that an ounce of prevention is better than a pound of cure, and nowhere is it truer than in the termite warfare. This phase will now be briefly discussed.

ALL termites have one thing in common. At certain times of the year they grow wings and develop into what is known as the "alate" form. When this happens, they leave the nest and start to fly, beginning at dusk. The dry-wood nesting type swarm in small numbers at irregular intervals throughout the entire year (in Hawaii), whereas the soil-nesting type usually swarm in comparatively large numbers (several hundred from a colony) during the period from March 1 to July 31. While swarming, they lose their usual fear of light and are strongly attracted to it. This gives rise to an excellent method for catching and destroying them before they have time to mate.

Barrels of water topped with kerosene are placed around the grounds of the depot, each with an electric light bulb

suspended over it. The alates fly to the light, strike against it, and promptly lose their wings, which break off at a predetermined fracture near the base. Deprived of their wings, the insects fall into the water and are killed. Over a pint of drowned termites has been taken out of a barrel as a result of a single night of operation at the depot.

Fig. 5. Termite Control, Treating Ground for Ground Nesting Termites, Carbon Disulphide is Being Injected.

However, this method, effective as it is, is of limited value. Only a tiny proportion of the termites swarming can be destroyed in this manner, for it is a method which can be used only in settled communities, and even there, it is not generally practiced. It is necessary, if possible, to prevent those alates which escape the lights from entering wood on which alone they can subsist.

It is, of course, impossible to prevent the soil-nesting termites from finding a suitable nesting place, but much can be done to prevent them from reaching the wood of a building. By the use of steel rods in the concrete foundation walls, cracks up which the insects can come are prevented to a large degree. If corrosion-resisting metal plates are used to top the foundation walls, and to serve as resting places for the studding, the chances of termites entering the building are greatly reduced. As an additional precaution, I have seen (in Panama) the concrete pillars on which the joists rest wound with burlap kept soaked with creosote compound, which effectually prevents the insects from building tunnels up the post to reach the wood.

None of these methods are of much use against the dry-wood nesting type, which build no runways, but fly directly to the wood where they plan to make their homes. Only two methods of combating them have been found, treated wood and woodless construction.

Wood may be treated with several substances, of which the best and most effective is coal-tar creosote. A cold painting or a straight dip in creosote is worse than useless, for it lends a false sense of security which may be disastrous. The creosote, to be effective, must be applied boiling hot under pressure for a period of eight hours, and the wood then allowed to cool in the mixture. This forces the preservative into the pores of the wood and effectually termite-proofs it. This was the method used in treating the wood for the construction of the new powder charge racks installed in the lower area of the Hawaiian Ordnance Depot last year, the work being done at the wood-treating plant of the Mutual Telephone Company.

The use of creosote, while effective, is open to very serious objections when used in dwelling houses, because of the pungent odor. In such cases, treatment with either zinc chloride solution, or some arsenical zinc compound, all applied under pressure to insure complete impregnation of the wood, is very successful, provided the wood can be protected from leaching, an unimportant matter where creosote is used. For *temporary* protection, a painting of material over the exposed end-grain with boiling hot creosote solution is quite effective. This treatment is routine at the depot for all ammunition boxes which have been through the gas house.

Fig. 6. Gas House at Hawaiian Ordnance Depot. Showing Material in Place Which has Just had a 72-hour Treatment with Carbon Disulphide.

While all these methods have their use, in constructing new magazines, warehouses, and especially binning, there is little justification for relying on them. None is certain, and there is one solution of the problem which, while it entails a considerable initial outlay, definitely and absolutely ends the possibilities of termite infestation. This is the method used in the construction of the new optical instrument storage depot.

The building is of all concrete and steel construction, even the floor being concrete, and all of the binning is steel. It is perfectly safe to state that no termites will ever get in that warehouse, or if they do, that they will starve to death. It is the hope of the depot officials to eventually replace all wooden binning with steel bins, and estimates have already been submitted to replace some of the worst infected bins in the general storage section, where certain sections, as before stated, must be replaced within the next two or three years.

This will help, but it is not the final answer. Small arms ammunition, field artillery ammunition, and general supplies will still come packed in wooden boxes for many years to come, and only eternal vigilance will serve to protect them. For, as the mythical private in the early part of this article said, "If you enlist for the duration of the war, you haven't got only a life-time job, you've got a job for all eternity."

The Great Pacifist Hoax

Enforcement of Prohibition and Disarmament Compared

By W. Armin Linn*

AN American diplomat once remarked—in private—that he oftentimes felt international disarmament diplomacy was conducted solely to humor certain sections of the public! From this we might gather that our diplomatic and political leaders have been merely masquerading. Were the flowery disarmament speeches and the Utopian disarmament proposals intended only to gain votes at the next election, or were they after all sincere in attempting to reduce the armaments of the world? What are the facts which might prove or disprove these thoughts?

Perhaps sincerity of effort as a whole might be judged somewhat by the magnitude of the achievement. Over the last fifteen years there have been a great many promises. How many of them have been realized? What has fifteen years of disarmament wrangling accomplished? Contrary to the prevailing opinion, armaments have not been reduced, they have been practically doubled since the days preceding the World War. Thirty-two out of forty-eight nations have increased their standing armies. Land forces of the world increased from 25,550,959 in 1914 to 54,040,482 in 1932. Naval expenditures of the five great powers increased proportionately, being $562,208,684 in 1914 and $940,181,440 in 1932.

The bitterness emanating from Geneva, however, is evidence that all is not play acting. It would appear that at least a few nations cherish illusions—illusions that, by diplomatic trickery, they can obtain a superiority or equality in armaments, which they could not hope to have by virtue of comparative manpower and industrial resources. After the initial shock and the subsequent chagrin experienced upon discovering that other nations are not to be so easily duped, their attentions have then been directed to the face-saving proceedings. Whereas Indian warriors were expected to bring home their victims' scalps, the principals of these miniature wars were pledged to bring home their opponents' armaments. An expectant public and an impatient press are not to be denied.

THE disarmament conferences have then achieved better harmony in settling down to their primary mission, which has been to entertain the public. In recent years "offensive weapons" has been constituted the subject for popular vilification, particularly popular because no one seems to know what an offensive weapon really is. To date no one has been able to point out any material differences in the armaments of defending and attacking armies in the late World War. Such stuff, however, sounds well. It looks good in the headlines. Who cares whether there really is such a thing as an offensive weapon?

No such perplexities, however, appeared to exist in the minds of disarmament "experts." Poison gas was quickly classed as one of those purely offensive weapons, although tactically the more effective gases have been used almost exclusively by the defense. Perhaps the conferees had in mind that poison gas, from its nature, cannot be stored in large quantities for any period of time. If abolished there would be very little to destroy. Moreover it can be readily manufactured, so its absence from existing armaments would in no way prevent its early use in military operations. At any rate, poison gas was "abolished," just as it was before the World War—a fact the press forgot to mention.

Tanks of twenty tons and over were included. On account of their great weight and lack of maneuver power they might better be considered as defensive weapons. However, in the interests of publicity, it was felt that the heavy tank should go. They may stay abolished, too, for tank experts throughout the world have been almost unanimous in the opinion that the super-tank is impractical. Bombing aircraft likewise were to be eliminated. The experts, who heralded this event as a great step towards peace, must have known that the bombers purchased recently by South American governments were nothing more than ordinary civilian planes, converted to carry five hundred pounds of bombs and two machine guns. Aircraft engineers estimate that civilian planes can be converted into bombers within as little as forty-eight hours. In the absence of regular military bombers, an army equipped with several thousand of these converted ships should be able to skimp along until better ones could be built. In this manner have our disarmament conferences labored. Were pacifists better versed in military matters, they would doubtless be quite incensed. However, let us now turn the spotlight from diplomats and politicians to the pacifist rank and file.

Disarmament in itself is the grossest deception ever practiced upon a trusting public. If the wildest of pacifist-dreams were to come true, and everything pertaining to armies and navies were to be eliminated, there would still be very substantial armaments. Effective disarmament is not only improbable, but impossible. However, before we become too downcast over that, let us reflect upon the fact that the absence of armaments would in no way insure peace, nor will the presence of armaments in any way make peace impossible. Nature somehow looks after us, in spite of the failure of our Utopian societies.

ABOLITION of weapons is a farce as long as there exists facilities for their manufacture. Armaments are important only in a relative sense. If every nation started from scratch with no armament, what difference would it make? In the wake of economic, political, social and religious conflicts, there would be the customary mob clashes. History is filled with wars which began in that manner. The American armies at Bunker Hill, Detroit, and Bull Run were called "armies" by courtesy only. At the outset these mobs would be armed with civilian arms, sporting rifles, shotguns and pistols. There would be home-made swords, knives and spears. In the museum at Charleston, S. C., is a very admirable saber made by a Revolutionary War hero out of a crosscut saw. There would also be barbed wire, trench digging tools, commercial dynamite, observation planes and cavalry.

*Contributor to current magazines. Member of the National Guard of Pennsylvania.

Then modern industry would set to work. At the end of six months the mobs, which now present some semblance of military organization, might be armed with grenades and better rifles. There might be an ample supply of poison gas and gas equipment, armored cars, airplane bombs, sabers, bayonets, and trench mortars. Fighting planes, machine guns, light artillery and tanks would now begin to make their appearance. The converted civilian planes which had been serving for months as bombers would begin to be replaced by better military types. At the end of two years all of the known modern weapons would be present in large quantities, and probably a number of new weapons never before heard of. Consider the development and manufacture of weapons during the World War. If there had been no armaments at all in 1914, to what extent would that have altered the course of the war? The real problem is that of preventing armament manufacture. Pacifists would have us believe that this is a relatively simple matter.

The pacifist picture that armaments are manufactured by a few large concerns is entirely false. Records concerning American munitions manufacture in the World War are all complete and available, if pacifists ever took the trouble to look for them. In his official report "America's Munitions, 1917-1918," no less an authority than Brig. Gen. Benedict Crowell, then Assistant Secretary of War and Director of Munitions, relates that when the armistice was signed, there were in the United States nearly 8,000 manufacturing plants working on ordnance contracts for artillery ammunition, big guns, rifles, machine guns, and other important supplies. Previous to our entry into the war not more than a score or so of these firms had been engaged in armament manufacture. Even back in 1917, a purely commercial industry was, within less than eighteen months, completely converted for mass production of military equipment. If one will but scan the long list of well known firms, manufacturers of such items as automobiles, sewing machines, farm equipment and silverware, and note the rapidity with which they turned to war manufactures, there is no more convincing argument as to the futility and absurdity of disarmament.

WEAPONS have always kept pace with the advancement of craftsmanship and industry. Armaments, in size and efficiency, have always paralleled the civilization of which they are a part. In the stone age, there was the crude stone hatchet, the spear and the bow and arrow. Military organization and tactics were on a similar plane. With the introduction of metals, the old weapons were improved and new ones were invented. Real armies then came into being. Ancient Rome marked the peak of civilization in the pre-gunpowder era. In corresponding grandeur and perfection were the armaments of that period. From 400,000 to 645,000 soldiers were regularly under arms. There were infantry, cavalry and artillery.

Weapons reached a high degree of efficiency. Infantrymen were armed with javelins and swords. They were preceded by archers and slingers. On their flanks were cavalry armed with lances and swords, while in their rear were the artillery, ballista and catapults. These large machines shot big arrows and hurled enormous projectiles an amazing distance. Poison gas was first used against the Romans during one of their sieges. These were the weapons which wiped out whole cities and civilizations. It is interesting to note that under disarmament doctrine, only one of them would be abolished!

With the advent of the machine age, the manufacture of armament passed from the gunsmith and the blacksmith shop to the factory. It followed naturally that a people who live by machinery would also use machinery when they had to fight. It is logical too that an industry which, for instance, manufactures annually millions of automobiles can also, when the occasion demands, prepare to flood the country with fighting tanks. Nor is it surprising that among the new discoveries of science and the many inventions that there should be a sizeable proportion adaptable to military uses. Poison gas was not the child of scheming militarists, but a development of the chemical and dye industry. The airplane was neither invented by soldiers nor initially designed for military purposes. The tank was not the product of a military master mind, but a development of the farm tractor.

On the other hand, quite a number of weapons have been converted to wide commercial uses. Gunpower gave birth to our great fabricoid industry. Nitrogen, which was first manufactured from their air for military purposes, is now being similarly manufactured for commercial fertilizers. A great many of the advancements in industry, engineering and medicine may be traced back to their military origin. The very science that has created this civilization can destroy just as efficiently as it builds, for the knowledge and the forces utilized in warfare can be applied with equal facility to either war or peace.

OPPOSED to the avalanche of facts and the experiments of history is the plan to "outlaw" war. Even with the repeal of prohibition, we still cling to the delusion that the evils of the world can be corrected by merely passing a law to that effect. After armaments had been outlawed, it is implied that all would be peace and happiness, for we would never have to worry about them any more. However, suppose all the nations did sign a treaty providing for the total abolition of armaments. How would it be enforced? The dreamers appear never to have thought of that. The attempt to enforce prohibition was bad enough. Enforcing disarmament would be infinitely worse. In the first place who would constitute the disarmament enforcement agency? If the League of Nations furnished the personnel, a majority of the "snoopers" would likely be foreigners, a fact which would not at all increase their popularity. The popular international sport might then be to see how much could be put over on the unsuspecting. Our safes which previously functioned as a storeroom for bootleg liquor, might then contain rifles or machine gun parts. Courteous guests, who in the past had been called upon to gag over some awful concoction, would now be confronted with the lesser ordeal of trying the trigger squeeze of our new automatic.

The number of enforcement personnel required for each country would considerably exceed the number required to enforce prohibition. Enforcement, to be effective at all, would need a disarmament enforcement officer in every factory and in every small shop. There are in the United States alone 210,959 factories and a much larger number of small shops. The number of "snoopers" required for the United States would be greatly in excess of the world's largest standing army. When we say "required," we speak advisedly. Such strict measures of enforcement are not really needed in the United States. Unless disarmament were to be an open joke, however, enforcement measures would certainly be necessary, let us say, in Europe. Anything which applied to one coun-

try there would also apply to the neighboring country. Enforcement provisions which applied to that neighbor would also have to apply to the next and so on. We can rest assured that some would never allow themselves to be caught in the nude, unless they were accompanied by some other particular friend.

The cost of disarmament enforcement would greatly exceed the costs of armaments. Whereas anyone, after a few samples, might be qualified to identify intoxicating liquor when he sampled it, a disarmament enforcement officer, to be any good at all, would have to be an ordnance expert. These are rather difficult to get in large numbers. While soldiers of the United States are paid only $17.85 a month, ordnance and manufacturing experts cannot, in ordinary times, be hired for less than $2,000 a year. The cost of this organization for the United States would total between one and two billion dollars annually for salaries alone. If the majority of the personnel are foreign citizens, it may be expected that much of this amount will find its way out of the country.

WHAT would be the nationality of each country's enforcement officers? While the Disarmament Enforcement Department of one country might be composed entirely of consciencious citizens, the next-door neighbors would have no faith in such an organization. The only logical solution would be for each enforcement organization to be composed largely of personnel from other countries. That enforcement officers were foreigners is a fact which could not be calculated to make their job a bed of roses.

Antagonism on the part of local law enforcement agencies proved one of the principal stumbling blocks of prohibition. What would be their attitude towards disarmament? However indifferent local authorities might be initially as to the cause of large armaments, antagonism and friction would soon be forthcoming. Just as disarmament officers would miss a great deal of actual armament manufacture, there would also be a host of charges and accusations without foundation. Let us assume a treaty—and it is not far fetched—in which it was stipulated that no further fortifications were to be constructed in certain areas. The enforcement agency in this case, let us say, is in the form of secret agents. Every time a new concrete sidewalk might be laid down in the vicinity of a strategic location, our State Department might receive an official protest concerning the strengthening of our fortifications there. Doubtless the first of these charges would be quite funny. The next few, however, would be less humorous. In a short time they would become exceedingly irritating.

During the era of prohibition our courts were clogged with violations of the Volstead Act. The National Recovery Act presented a somewhat similar situation. In a short period 5,000 reports of violations were received from Philadelphia alone. How will disarmament violations be punished, or even stopped? Will violators in Germany be acquitted by German courts? Who will punish the international "chiselers," and how?

The problems of enforcing disarmament would be infinitely complicated. There are in the United States, it is estimated, over 7,350,000 firearms used by sportsmen. Quite a number of hunters prefer military rifles. If, after disarmament, the number of "deer" rifles increased by about two million, what will the disarmament enforcement officers do about it? Nothing in the disarmament treaty provides for eliminating hunting. Moreover accurate information on such matters would be very difficult to get. Weapons such as sabers, bayonets, and knives could be made and distributed to members of a secret military organization under the very noses of the enforcement agency. Very little of it would ever be discovered.

IN factories the situation is even more hopeless. Suppose a country, disarmed by treaty, wished to build 25,000 tanks. The first step would be to design a tank which would be different from existing tanks, so that disarmament experts would not recognize the parts. A second consideration in design would be to incorporate a maximum proportion of machinery and parts, similar to that already being manufactured for commercial purposes. The next step would be to alter commercial equipment to utilize a maximum number of those tank parts not already in commercial use. Manufacture of the remaining parts could then be split up among a hundred different factories. The parts would then be stored in various places over the territory of that country. Upon short notice the tank parts could be shipped to various assembly centers, and the 25,000 tanks would be on their way. If, in the meantime, a disarmament enforcement officer happened to discover 5,000 machine parts held in storage for the Blank Truck Company by the Blank Spinning Machinery Corporation, it is unlikely that his suspicions would be aroused. If they were, what could he prove? Can he go into court with a cog or a pin and receive serious consideration when he talks about tanks?

Other weapons lend themselves similarly to this method of manufacture. Nearly any could at least be partially completed. Poison gas and aircraft are particularly adaptable. Chlorine gas is used extensively commercially. Military aircraft can be built ostensibly for civilian uses. Little time would be required to convert these specially built craft into pursuit and attack ships, observation planes and bombers.

We have not yet mentioned the machinery to manufacture armament. When it is said that so many months are required to begin mass production of a certain weapon, it usually means that that time is required to manufacture and assemble the equipment necessary to convert an industry for its manufacture. If, however, factories were all set to change over, then mass production of armament, instead of being retarded by six months or a year, could begin almost at once. When it is impossible even to stop the manufacture of armament, how is it expected to prevent the production of tools, jigs, and dies, used in their manufacture. Separated as were the tank parts, how is any one to figure out what they will be used for?

Psychologically the effect of total disarmament upon peace would be more disastrous than the worst large armament competition. A country which maintains a normal and efficient armament can rest in a fair degree of security even though her neighbor maintains an armament 50 per cent or even 100 per cent larger. The smaller armament could normally delay an invasion sufficiently to allow time for the country to organize. The adversaries would then be about evenly matched in military power, providing they were, in other respects, nearly equal.

Variations in armament at the bottom of the scale, however, are of considerably greater moment than they are at the top. With large armaments a difference of several hundred

thousand equipped soldiers would not necessarily be disastrous. On the other hand, with total disarmament, or exceedingly small armaments, a superiority of fifty thousand would likely result in a quick victory, as demonstrated in history on numerous occasions. War on that basis would again become quite profitable.

Consequently, under any conditions bordering upon total disarmament, even the smallest details of disarmament enforcement are of extreme importance. Whereas wars in the past were won by the largest and strongest nation, they would now be won by whichever one could cheat the most. A time-advantage of even a month or two in training, and mass production of weapons, means the difference between victory and defeat. The incentive for treaty violations would be great, the probability of detection small.

WHAT would be the mental attitude? For every report of actual treaty violation, there would be a score or so of erroneous reports. Charges would be liberally passed back and forth. Look at France, now protected by a "ring of steel." Note the public alarm over reports that Germany is re-arming. Take away from France her armament, then, what would be the state of mind of the French people?

Are disarmament treaties useful for partially limiting armaments? From the results of the last fifteen years, it would seem that they are not. As disarmament supporters would very properly have taken credit for any reduction in armaments, perhaps they can also assume responsibility for the fact that armaments have doubled. Disarmament methods have done much to defeat the thing they seek to accomplish. Why do nations maintain armaments at all? A moderate armament can be attributed to common sense. Excessive armaments, however, are inspired by only one thing—fear. No people will submit to the financial burden of a large armament unless they feel a very urgent need for it. What is the popular feeling in France? In Italy? Our pacifist, quasi-communist publications charge that armaments are foisted upon the masses by wicked capital. In answer to that we have merely to point to Russia which, with 16,000,000 soldiers, has the largest army on earth.

Pacifists have endeavored to frighten people into disarming, just as a quack would frighten his prospective patients into being "cured." We are told over the radio that another great war is imminent unless the world disarms at once, and quite obviously the world is not disarming. The press informs us in the front page headlines that pacifists predict another World War. Uncalled for publicity is given to the size of various armaments. Well meaning periodicals constantly portray the horrors of war and proclaim how modern weapons in the next war will wipe out complete populations. All eyes have been directed towards war by this new armament phobia. In comparison the saber-rattling of the old "war lords" pales into insignificance. How can armaments be decreased under these conditions? Are any people ever afraid of their own armament? Who is going to throw away his life preserver when he feels the ship is about to sink?

Very fortunately natural laws limit armaments where peace "doctors" fail. There is really no need to argue about whether a nation shall be permitted to build battleships which it cannot afford. Both industry and money are indispensible to military operations. Large armaments deplete the national treasury. High taxes cripple industry. In the interests of national defense, armaments would normally be reduced to the minimum, consistent with national safety. Then, too, the continual development and change in weapons makes it dangerous to stock up with a large supply of equipment.

Peace, like other movements, has suffered infinitely more from its friends than from its enemies. One of the worst things pacifists have done has been to establish the thought that peace is not possible while armaments exist. On the contrary, the breakdown of modern peace movements may be attributed to their failure to look beyond armaments for the causes of war. In concentrating upon weapons, we have forgotten about the spirit which prompts their use. Why should French armament cause Germany anxiety, yet be a matter of little concern to England? Why does American armament seem to worry some countries, while it is of little interest to Canada, our next door neighbor?

International friendship is one of the prime requisites of peace. Has disarmament been a means of promoting friendship? On the contrary, press reports from headquarters sound like dispatches from the front. At each disarmament conference, there is always an international villain. Towards the end of the conference, each nation has firmly implanted in its mind the fact that they are all villains, except itself.

WHEN confidence is established between peoples, there can be peace in the midst of the largest armaments. Without international confidence peace is impossible, regardless of armies and navies. In its efforts to abolish armaments, pacifist propaganda has destroyed confidence and created in its stead an era of world cowardice. Very soon we shall be afraid of every man who carries a knife in his pocket, and every dog with a full set of teeth. The thought that each nation must be made harmless is as cowardly as it is absurd.

While the world is obviously not in favor of scrapping armaments, there is ample evidence that it sincerely desires peace. If war, instead of peace, is on the horizon, it may be attributed in a large degree to the quack cures which pacifists have been prescribing. Of the many pacifists who pose as disarmament authorities on the lecture platform, on the radio, and in the countless newspaper and magazine articles, how many really know anything about armaments and armament manufacture? What research have they made as to the causes of past wars, and the probable causes of war in the future? A few, perhaps, have gone into the matter extensively from the theoretical standpoint, but in most cases even the theory is missing.

When better international relations are achieved in the world, it will be by the same methods which have advanced science and medicine. History will constitute the textbook—and that history will not begin with the first peace conference, but with the days of Greece and Rome. With our superior civilization we have made the error of assuming that man himself has greatly progressed. Remove from man his inheritance of knowledge and material wealth and we will find that he has progressed little, if at all, since the day of Julius Caesar. He is swayed by the same passions and emotions. He is dominated largely by the same interests. When peace plans become practical and have as their foundation the world as it is—instead of the world as it should be—there is every reason to expect progress towards decreasing war.

When that time arrives, it is not too much to expect "militarists" and pacifists to coöperate with each other. Soldiers are perhaps the most sincere in wishing peace. They should be. They suffer most from war. They gain least.

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Month by Month

MEMBERSHIP in that select and distinguished company of former chiefs of the Ordnance Department was increased by one on October 31, 1934 when Maj. Gen. Samuel Hof was retired from active service having reached the statutory retirement age. Military ordnance in the United States now boasts a trinity of former chiefs, who, though not in active service, are in reality actively regarded in the affection and esteem of all their friends. Maj. Gen. William Crozier, whose record service as head of the department from 1901 to 1917 is, at the age of 79, as hail and hearty as any man twenty years his junior. He is keenly alert in the study of all problems connected with the field in which he specialized and physically is so energetic that he is now enjoying a round-the-world cruise.

RETIREMENT OF GENERAL HOF

Maj. Gen. C. C. Williams is likewise as constant a student of ordnance matters in his retirement as he was when he commanded the great ordnance organization during the World War and the twelve years he spent as Chief of Ordnance thereafter. His Washington friends had awaited his usual return to the Capital City for this winter season and regret they will be deprived of his companionship while he continues his residence at South Hamilton, Mass.

General Hof, the junior member of this triumvirate, is now enjoying the relaxation of retirement from active service at his home in Washington, D. C. We have our doubts that he will be content to remain out of harness and we should not be surprised were he soon to resume activity in some commercial field.

General Hof's retirement brings to a close a military career of unusual significance. Born in Wisconsin October 24, 1870, he was graduated from the United States Military Academy, a member of the class of 1894, and was commissioned a second lieutenant of Cavalry. His first station was at Fort Yellowstone until 1897 when he was appointed an instructor at West Point and commissioned a first lieutenant in the Ordnance Department. Beginning in 1898 he served successively at the Watervliet Arsenal, Sandy Hook Proving Ground, Watertown Arsenal and Frankford Arsenal. At the latter station he was inspector of ordnance and powder. He served at the Rock Island Arsenal from 1908 to 1914, next at the Springfield Armory and for three years, from 1915 to 1918, he was commanding officer of the Manila, P. I., Ordnance Depot and Ordnance Officer of the Philippine Department.

During the World War, then a colonel, he was appointed commanding officer of the Frankford Arsenal where he served from March, 1918, to March, 1919. The year following he was acting chairman of the Ordnance Department Claims Board and chief of Ordnance Field Service. General Hof was graduated from the Army War College, a member of the class of 1921, later serving as chief of the Artillery Automotive Section of the Technical Staff and as chief of that division of the Ordnance Office until 1923. Next he became chief of Field Service where he served until he entered Harvard University in 1924 from which he was graduated in 1926, with the degree of Master of Business Administration after a two-year course. He then became Ordnance Officer of the Second Corps Area with station at Governors Island.

July 21, 1927 General Hof again returned to Washington to become chief of Field Service with the rank of brigadier general. He served in this capacity until June, 1930, when he was appointed Major General Chief of Ordnance succeeding General Williams.

General Hof's term of office as Chief of Ordnance was marked by a general advance in ordnance design and manufacture and constant attention to the efficiency of the supply functions of the department. He continued the policies of his predecessor and was instrumental in carrying forward the close coöperation of American industry with the department's problems. General Hof's four-year term as Chief of Ordnance expired June 2, 1934, when he was succeeded by the present chief, Maj. Gen. William H. Tschappat.

In his retirement from active service General Hof has the esteem and admiration of his many friends not only for his integrity and leadership throughout his entire career but equally for the service rendered during the climax of his military tenure as Chief of Ordnance. As will the select group of which he is now the third member so the more numerous band of ordnance friends, represented by the Army Ordnance Association, salute General Hof for the fine things he has done. The Distinguished Service Medal which he wears for his achievements in war might well be inscribed with an added notation that he is a worthy member of the distinguished group of former chiefs of ordnance. All will wish him and his two associates many years of enjoyment of this rare distinction.

With deep regret announcement is made of the death of two directors of the Army Ordnance Association. Mr. Ralph M. Dravo, President of the Pittsburgh Post, A.O.A., died at his home in Pittsburgh November 11 and Mr. Pliny E. Holt, President of the California Post, died suddenly at his home in Stockton, Calif., November 18. Word of these severe losses was received as this issue went to press. Tribute to their great ordnance achievements will appear in the next issue.

IT is no new thing to call attention to our national good luck from the standpoint of muddling through when our country had the bad luck to go to war. That we got through in many respects by the skin of our teeth will be admitted by all students of national conditions and international relations. This applies forcibly to all our emergency experiences prior to 1917 and applies surely, if not quite by the skin of our teeth, to our World War experience. Regardless of degree the United States has never entered the ranks of a belligerent prepared in any commensurate way. Our problems have been as much of manpower as of munitions power; our volunteer and militia systems for a century were a cause of concern; our facilities for the production of needed armament required the best thought and speediest action of our best minds. With us recruiting and training manpower after the starting whistle had blown reminds one of a truculent coach calling the team together only after starting time. Our proverbial lack of the sinews of defense more definitely has its simile in Mother Hubbard; like this kindly lady in time of need we have gone to our cupboard of military arms and equipment too frequently to find it bare. Our accustomed method of citing the costly effect of the World War to sustain this point is, of course, based on experiences which are freshest in the minds of living men. But the record is the same as witness the writings of commentators on past experiences going on back to our first steps of national babyhood.

THE EFFECTS OF UNPREPAREDNESS

In all these narratives the burden of showing the effects of preparedness are, with one exception, what we might call negative deduction. This exception was stressed recently by Dr. Alex Dow, the distinguished Chief of the Detroit Ordnance District, in an address delivered at the University of Michigan. His logic is quite irrefutable. The history of all nations shows that the unprepared people had war forced upon them and had terrific losses in men and property before it got its war into shape. As Dr. Dow pointed out, the United States has never entered a war prepared for it, it has always suffered terribly in the early stages, lack of preparation has not kept us out of wars so it might be well to try if being prepared might have that effect.

The predominant instance of our preparedness having this effect seems to prove the point. Dr. Dow cited the occasion when French influence and assistance had set Maximillian upon a very shaky throne in Mexico. The time was thought to be opportune as the United States was then engaged in a civil war. As in every other war in which we have engaged, our country was well prepared *at the end* of the Civil War. Consequently it was not necessary to back by armed intervention the diplomatic objections made to the establishment of a European dynasty in Mexico.

The point is not that militarism in any way, shape or form is advocated. Rather the proof lies along the line that ability to assert rights is in direct ratio to the sanction upon which that assertion rests. The effects of unpreparedness are legion; the effects of preparedness from the standpoint of national policy are few because the number of instances with us are few. Maybe this is what General Washington had in mind when he said, "There is a rank due the United States among nations which will be lost by the reputation of weakness."

To go one step behind the World War we have some pertinent testimony regarding the Spanish-American War. Col. Theodore Roosevelt, who was to become our twenty-fifth President, said of our military preparedness, "Against a good nation we should be helpless." Mr Alger, the Secretary of War, said, "It is doubtful if any nation rated as a first-class power ever entered a war of offense in a condition of less military preparation than was the United States in 1898." General Miles, when ordered to take an army of 70,000 men and capture Havana, wrote, ". . . my sense of duty . . . prompted me to explain to the President the real military conditions, as he had evidently been misinformed. I told him . . . that while I was very anxious to go, and while the morale of the Army was most excellent, the most serious difficulty was that there was not enough ammunition in the country . . . for an army of 70,000 men to fight one battle, and that our cartridge factories could not manufacture an adequate amount in eight weeks time. . . ."

IN the welter of discussion which is making the rounds these days on the subject of national defense there are quite a few observers who speak very trippingly about the commandeering of property for emergency use as an efficient method of mobilizing the nation in arms. The subject being far from academic requires a rather practical approach. No less an authority than Gen. Hugh Johnson, former Administrator of the National Recovery Act, has outlined the pitfalls of this academic philosophy in no uncertain terms. Several years ago General Johnson honored this Journal by allowing it to publish an article from his pen entitled "Fallacies of the Universal Draft." This was published in the November-December 1929 issue of ARMY ORDNANCE, Volume X, No. 57. To use his own words we cite the following excerpt from this article:

HOW NOT TO COMMANDEER

"Industry in the United States is a delicate pattern of interrelated strands. It has been evolved in response to the needs of the Nation and under natural economic laws but dimly understood and subject to arbitrary and artificial interference only at the risk of starting a sequence of upheavals the ends of which no one can foresee. It is guided and operated by men who have attained their places in a fierce economic struggle for survival and generally these men are where they are because of demonstrated fitness. The difficulty of replacing good men and the evil of appointing poor ones even in peacetime administration is warning enough against wholesale replacement under the terrific added stress of war.

"During the World War it was thought by some that the Steel Corporation was not complying sufficiently with governmental instructions and a project was bruited for 'taking over' (conscripting, confiscating or drafting) the U. S. Steel Corporation. It split on the rock of this argument:

" 'Who will run it? Do you know another Judge Gary? Would you replace a proven genius by a problematical mediocrity? And after you "had taken it over" and installed your man, what greater control would you have than now? *Now* you can choke it to death, deprive it of transportation, fuel and power, divert its business, strengthen its rivals, do far more than seize and pay for it. If you "take it over" you can only give orders with far less sanction than you give them now. The fault is yours. Let Judge Gary run the Steel Corporation and you run Judge Gary. If you can't do that with your almost boundless power it is you who should be "taken over"—not the Steel Corporation.'

"This argument seems unanswerable on the question of 'drafting industry.' By the Priorities System, the control of prices and the ever present and little-used threat of confiscation, the Government, in 1917–18, literally rationed to industry the wherewithal of life and there is no doubt that in another great emergency the same powers would be used. The problem of controlling industry no longer resides in unknown territory. The question is administrative merely and not organic."

General Johnson, it will be remembered, is among the few men in the country who are well equipped by actual war experience to express a doctrine on this subject. As usual with his type of expression there is not any doubt as to his meaning. His thesis is fundamentally based on realism. Anything less than realism would be ruinous. Idealism on the subject is both confusing and, as is generally the case, ineffective.

DON'T FORGET THE DEFENSE ACT

IN the vein of the preceeding paragraphs wherein fundamental concepts of our national defense policy are recalled, we might continue on with still another observation which the passage of the years has dimmed in the memories of some observers. When we speak of industrial preparedness we do not refer to a mythical thing which is no more than a hobby in the minds of a few but rather to a definite doctrine which has the organic law of the land as its basis. Industrial mobilization, which is industrial preparedness in action, is specifically provided for in the National Defense Act of 1920. The Act was framed when World War experiences made their deepest impression. For the benefit of those who are interested in quoting authorities we cite the following excerpt from the National Defense Act which is the mandate of the people through their chosen representatives for the achievement of industrial preparedness. Section 120 of the Act reads as follows:

"Purchase or Procurement of Military Supplies in Time of Actual or Imminent War.—The President, in time of war or when war is imminent, is empowered, through the head of any department of the Government, in addition to the present authorized methods of purchase or procurement, to place an order with any individual, firm, association, company, corporation, or organized manufacturing industry for such product or material as may be required, and which is of the nature and kind usually produced or capable of being produced by such individual, firm, company, association, corporation, or organized manufacturing industry.

"Compliance with all such orders for products or material shall be obligatory on any individual, firm, association, company, corporation, or organized manufacturing industry or the responsible head or heads thereof and shall take precedence over all other orders and contracts theretofore placed with such individual, firm, company, association, corporation, or organized manufacturing industry, and any individual, firm, association, company, corporation, or organized manufacturing industry or the responsible head or heads thereof owning or operating any plant equipped for the manufacture of arms or ammunition or parts of ammunition, or any necessary supplies or equipment for the Army, and any individual, firm, association, company, corporation, or organized manufacturing industry or the responsible head or heads thereof owning or operating any manufacturing plant, which, in the opinion of the Secretary of War shall be capable of being readily transformed into a plant for the manufacture of arms or ammunition, or parts thereof, or other necessary supplies or equipment, who shall refuse to give to the United States such preference in the matter of the execution of orders, or who shall refuse to manufacture the kind, quantity, or quality of arms or ammunition, or the parts thereof, or any necessary supplies or equipment, as ordered by the Secretary of War, or who shall refuse to furnish such arms, ammunition, or parts of ammunition, or other supplies or equipment, at a reasonable price as determined by the Secretary of War, then, and in either such case, the President, through the head of any department of the Government, in addition to the present authorized methods of purchase or procurement herein provided for, is hereby authorized to take immediate possession of any such plant or plants, and through the Ordnance Department of the United States Army to manufacture therein in time of war, or when war shall be imminent, such product or material as may be required, and any individual, firm, company, association, or corporation, or organized manufacturing industry, or the responsible head or heads thereof, failing to comply with the provisions of this section shall be deemed guilty of a felony, and upon conviction shall be punished by imprisonment for not more than three years and by a fine not exceeding $50,000.

"The compensation to be paid to any individual, firm, company, association, corporation, or organized manufacturing industry for its products or material, or as rental for use of any manufacturing plant while used by the United States, shall be fair and just.

"The Secretary of War shall also make, or cause to be made, a complete list of all privately owned plants in the United States equipped to manufacture arms or ammunition, or the component parts thereof. He shall obtain full and complete information regarding the kind of arms or ammunition, or the component parts thereof, manufactured or that can be manufactured by each such plant, the equipment in each plant, and the maximum capacity thereof. He shall also prepare, or cause to be prepared, a list of privately owned manufacturing plants in the United States capable of being readily transformed into ammunition factories, where the capacity of the plant is sufficient to warrant transforming such plant or plants into ammunition factories in time of war or when war shall be imminent; and as to all such plants the Secretary of War shall obtain full and complete information as to the equipment of each such plant, and he shall prepare comprehensive plans for transforming such plant into an ammunition factory, or a factory in which to manufacture such parts of ammunition as in the opinion of the Secretary of War such plant is best adapted."

Coincident with this mandate is the other portion of the Act, Section 5a: "Hereafter, in addition to such other duties as may be assigned him by the Secretary of War, the Assistant Secretary of War, under the direction of the Secretary of War, shall be charged with supervision of the procurement of all military supplies and other business of the War Department pertaining thereto and the assurance of adequate provision for the mobilization of matériel and industrial organizations essential to war-time needs." Here is declared national policy born of war experience. It is one of the most progressive and vital effects of the World War; its framing was a tremendous advance in policy and its permanency must always be assured.

Facts About Munitions Makers, IV

An Editorial

NATIONALIZATION of the armament industry in the United States looms large in public discussion at the moment. By "nationalization" we understand to be meant the manufacture of armaments by and in Government-owned factories or arsenals exclusively. Such a proposal, if adopted, would prohibit any production of any kind of armament in establishments of which the Government is not the sole owner. This proposal for nationalization is advocated by many individuals as the cure not only for the alleged ills of the armament trade but more especially as an ultimate cure for war itself. Let us examine the proposition in the light of facts and see just how preposterous and damaging this alleged war cure, or war deterrent, would be to the national defense of the United States.

Of course, there are some preliminary notions on the general subject of war and peace which require restatement for the sake of clarity. Many commentators on the subject in our midst today are inclined to take an occasional sentence here and there from some discussion such as this, and misconstrue it most outlandishly. At the risk of repetition, perhaps it is best to restate once more some fundamental concepts in an effort to prevent misunderstanding. We repeat, therefore, that this Journal and the organization by which it is published are not spokesmen for any armament manufacturer in this country or abroad; they are not subsidized by any such individual or group; they have no commercial interests or alliances; they exist for only one purpose—the adequate national defense of the United States through industrial preparedness in peace and in war. Likewise there are certain axioms which we consider to be as certain as any mathematical proposition. Among these are that modern armaments of themselves do not cause war (war existed centuries before arms as we know them were thought of); modern arms do not prolong war (history gives ample proof of this); and modern weapons do not make war more horrible or destructive (to which history, again, testifies). These follow from the first and greatest axiom that if armaments were to disappear entirely wars would not cease or become more infrequent. In other words, armaments are an effect, and not a primary cause, of world conditions at any given time.

NOW, for an approach to the question of the nationalization of the armament industry in the United States let us have a little orientation. Let us turn to the final report issued by General Pershing, our great Commander of the American Expeditionary Force 1917-18. The General is describing the lack of armament for American troops at the beginning of the World War and indicates, with satisfaction, the good fortune of the A. E. F. in being able to secure our needed armament from France. General Pershing says, "We sought assistance in obtaining the guns needed *at least for the first two years.* It was most fortunate that we were able to get these guns from the French as up to the end of the war no guns manufactured at home for our Army, of the types used, except twenty-four 8-inch mortars and six 14-inch Naval guns were fired in battle." There is food for a great deal of thought in General Pershing's words. Whyever did our Commanding General have to make any such arrangement and for so long a period of time? Some readers may imagine that he might have been warranted in borrowing or buying a few guns for the A. E. F. for training purposes until the convoyed merchantmen should bring an ample supply from home. *But why should he have arranged to obtain the guns needed at least for the first two years?* The answer is startling in its simplicity: *we did not have the guns in the United States, we did not have the means for producing them in quantity and it would take safely two years for American industry to learn its new task and swing into quantity production!* History will record that when the group of officers appointed by General Pershing, of which Lieut. Col. C. C. Williams was the senior member, met on board the S. S. BALTIC enroute to France in June, 1917, it made a momentous, yet necessary, decision. It recommended "that the American Army should in the beginning use French artillery, this policy being extended to include additional French and British artillery, artillery ammunition, machine guns and trench warfare material. There were several important considerations that led to these recommendations, among which were the long period that must elapse before this particular material could be produced in quantity in the United States . . . ."

THUS it was that the American Army was furnished an effective—indeed a Providential—stop-gap by its Allies until our own production of armament in Government arsenals *and* private plants should be able to begin. The story of our effort in public and private plants is an epic which is forgotten by many who consider themselves students of the American munitions problem. For their benefit we could repeat some of the salient facts of that record. We could describe at length how American industry—there were only meager Government facilities and some private munitions makers at work on supplies for our Allies—had to begin from scratch; how science and industry had to be coördinated; how the problem was as broad as American industry itself; how this highly specialized type of production in a highly specialized art had to be learned by American engineers and executives from the ground up; and how, when it was all over, there were 5,000 plants working on direct ordnance contracts, some 8,000 plants in all producing military supplies. The record from the standpoint of willingness to learn and to do everything humanly possible is a brilliant one and will go down in history as a crowning achievement of our modern industrial resourcefulness. There were costly delays and many mistakes but American industry was mobilized eventually and did the job most creditably.

Today we are back on a peace footing where we have been for sixteen years. As before the war, we have six Government-owned manufacturing arsenals for the production of ordnance equipment; they are centers for the development of material, the training of personnel, and a barometer of manufacturing costs. As before the war, we have a few private companies producing propellent powders, explosives, small arms, ammunition, forgings, etc., as a very minor part of their production of commercial products and we have one or two companies engaged in ordnance manufacture exclusively. These few companies are our only reserve of facilities and technique where actual experience is being gained in time of peace—experience so priceless in time of war. Their small production is

utilized in part by our Government, in part by the legitimate national defense needs of other countries, particularly the non-industrial, i. e., non-arms-producing, countries. Our munitions position fifteen years after the World War is almost identical with what it was fifteen years before the war, except that we have learned one big lesson. That lesson we call industrial preparedness. We now know what we need for our fighting forces and in what quantities. In the National Defense Act of 1920 the American people gave their mandate to our Army: it must plan in detail for another major war should it unfortunately ever come again. Our peace-time industries of every nature have their important places in the planning picture. The transition from a peace to a war footing will be much simpler, more efficient and far less costly than it was seventeen years ago. And in addition we have the few commercial companies which, as byproducts, produce some supplies which are essentially military. For years students of industrial mobilization have urged a system of educational orders for munitions by which industrial establishments which are not familiar with production difficulties might be enabled to produce small quantities of armament at stated intervals for our Army in time of peace, simply—as the name implies—for education. Thus far educational orders as such have not materialized except for those few companies which are selling supplies to our own and other governments for their legitimate defense needs. So much for the background.

WHAT of nationalization of the arms industry as a practical measure? Only this: from the standpoint of supplying our needed armament in time of major war nationalization is a preposterously absurd proposition.

There is only one attitude to take toward the maintenance of peace: the attitude of realism. Our national policy in respect of an arms industry, whether it be exclusively Government-owned and operated, whether it be part Government and part private, whatever its form, must be realistic. *That policy must guarantee our national defense needs in war.* Anything short of that is only a cloak to cover inefficiency, and inadequacy—synonyms in time of emergency for defeat. Now, to say that nationalization would be efficient in providing for the major war needs of an army in time of war is worse than a dream—it is a nightmare. National factories could not begin to have the capacity to produce all the munitions needed for a major war unless you are willing to admit that national factories should have the capacity to produce practically everything an army uses in time of peace. The World War proved beyond shadow of a doubt that every resource of mental and material power of the nation at war is required when victory is at stake; the war also proved that in many fields there are not nearly enough of certain resources. In our modern civilization a major nation at war must enlist every type of industrial facility and professional service—it is not the Army and Navy only that go to war, the whole nation girds for victory. As General Hugh Johnson has said, "Risk of national existence on the hazard of only a fragment of national defensive strength is a thing of the past."

Who would attempt to define just how far nationalization would go—national defense needs being foremost, mind you? Would it mean that only finished products, for example, rifled gun tubes, would be produced in Government-owned factories? If so why stop there? What about the machines which do the rifling? Or the raw materials which go into the forgings? Or the power which turns the wheels? All these elements are essential parts of completed armament. Would it be said under a policy of nationalization that forgings would continue to be made in private plants and only the finishing touches put on in Government-owned arsenals? Or would it mean, in the case of smokeless powder—let us say—that the mere processing of the cotton, nitric acid and alcohol into powder would be done in Government factories and the production of the raw materials be left in private hands? Maybe proponents of nationalization have in mind only the finishing touches, in which case they are completely forgetful that implements of modern war are but modifications of the implements of modern peace. So, *to carry the speculation to its logical conclusion, nationalization of the arms industry means nationalization of all industry—if we are to be ready for another major war.*

WE can go a step further to bring the discussion out of the realm of mental speculation and reduce it to a matter of dollars and cents. Nationalization of the arms industry in the United States, if it were attempted, would be the most costly of all Government enterprises. Let us take pencil and paper and figure the thing out from a cost standpoint. Let us confine ourselves to the production of military ordnance only, leaving out of the picture the naval and aeronautical armament and all component materials. We have in the United States today six manufacturing arsenals; in the opinion of experts these Government-owned factories are capable of producing less than 5 per cent of our requirements for a major war. *Therefore, if the nationalized industry is to be capable of handling the major war-load it must be expanded immediately to 19 times its present capacity.* Now, with pencil and paper, take note of the following approximate valuations, or costs, of plant and equipment of these six manufacturing arsenals, this 5 per cent of requirements in major emergency. They are: (1) Frankford Arsenal which produces small arms ammunition of all types, metal components of artillery and trench warfare ammunition, fire-control and range-finding instruments, optical parts and gauges, valuation approximately $21,000,000; (2) Picatinny Arsenal with its experimental ammunition development plant and its facilities for the manufacture of powder, high explosives, metal components, pyrotechnics and ammunition loading, valuation approximately $9,000,000; (3) Rock Island Arsenal which produces artillery matériel, gun carriages, limbers, caissons and tanks, valuation approximately $78,000,000; (4) Springfield Armory which manufactures shoulder rifles, spare parts, appendages and bayonets, valuation approximately $13,000,000; (5) Watertown Arsenal which produces gun forgings, gun carriages, railway mounts, projectiles and castings, valuation approximately $22,000,000; (6) Watervliet Arsenal which manufactures light and heavy guns and accessories, valuation approximately $20,000,000. Here is an approximate total valuation—and a flagrantly conservative one—of these six plants amounting to $163,000,000. Now this represents 5 per cent of the required capacity in major war. One hundred per cent capacity for war-time needs would cost *immediately* nineteen times the present combined valuation; i. e., $3,097,000,000. Quite a formidable sum no matter how you look at it! And it is only the first cost. Capitalize this amount as low as 3 per cent and John Taxpayer is faced with an annual finance cost of $92,910,000 on plant and equip-

ment only. Then there is the cost of amortization of plant and equipment which we are not taking into account at all. Then, too, the cost of obsolesence. If, for the sake of argument, we assume that a major war would not be thrust upon the United States for the next twenty years or the next ten years, much of this huge national plant and equipment would be obsolete and before it could work would require costly replacement and modernization. Then, too, there is the cost of personnel to operate this nationalized industry in time of peace which would add a several million dollar payroll to the annual expenditure. Then, again, considering the very small need for armament in time of peace, the nationalized facilities would perforce operate at less than 1 per cent of capacity for, it should be remembered, the six arsenals we now have are operating at certainly not more than 10 per cent of their capacity.

So after a first cost of more than $3,000,000,000 the annual bill for interest and payroll alone would be around $100,000,000. It makes our average $10,000,000 annual appropriation for the peace-time requirements of our Army for arms produced in Government-owned and private plants dwindle to insignificance. This huge white elephant would be so costly in its operation that it would not be operated at all. For this statement there are ample precedents. We have the glaring instance of the armor-plate factory of our Navy Department at South Charleston, W. Va. This establishment came into being because it was contended that the cost of armor plate as produced by private steel companies was excessive. The plant was built to overcome this objection and today it stands in idleness. Only recently the Chief of the Bureau of Ordnance of the Navy Department wrote, "During and shortly after the war the Navy Department built at South Charleston, W. Va., an elaborate steel plant which produced a small amount of armor, gun forgings and projectiles *but it was found uneconomical to maintain this plant in operation* and for some years past all armor needed has been obtained from the steel companies of America." More significant is the case of the war-time Muscle Shoals nitrate plants. Plant No. 2 cost the taxpayers of the country approximately $65,000,000, and then stood in idleness for fifteen years.

THIS question of exclusive Government manufacture of arms in the United States was examined thoroughly, and as thoroughly rejected, eighteen years ago when war was imminent. Under the provisions of Section 121 of the National Defense Act of 1916 (approved June 3, 1916) a board, known as the Kernan Board, was appointed to study and recommend upon this very subject. The board consisted of Col. Francis J. Kernan (later Major General Kernan who organized and commanded the Service of Supply, A. E. F., November, 1917, to July, 1918, and who served as a technical military adviser to the American Commission to Negotiate Peace at Paris); Lieut. Col. Charles P. Summerall (later General Summerall, commander of the First Division, and of the 5th, 9th and 4th Army Corps, A. E. F., an adviser to the American Commission to Negotiate Peace at Paris, and Chief of Staff of the United States Army 1926 to 1930); Mr. Benedict Crowell (later the Assistant Secretary of War and Director of Munitions during the World War, Brigadier General, Ordnance Reserve Corps, and President of the Army Ordnance Association since 1919); Mr. Robert Goodwyn Rhett, (financier, of Charleston, S. C., at the time of his service on the Board, President of the Chamber of Commerce of the United States); and Maj. Lawson Fuller, U. S. Army, retired, recorder.

The Kernan Board made an exhaustive study of the entire problem of nationalization. It studied the question of comparative costs and found "with few exceptions the Government cost is less than the corresponding purchase price" by about 11 per cent. But on this point the Board said, "This result should cause no surprise. . . . The Government has no selling expense; it carries no insurance, but merely pays its fire and accident losses at their actual cost, estimated at about three-tenths per cent; its borrowing ability, as related to the cost of its investment, is exercised at a much lower interest rate; it has the advantage of long-continued experience in a few specialized lines and, finally, it makes no profit." The Board investigated the cost of building and operating Government plants adequate for all public needs and concluded on this score that the estimates—which later experience proved to be hopelessly inadequate—confirmed "beyond all doubt the salient fact that the cost of plants fully equipped and adequate in output to the possible needs of this country in a great war is enormous."

THE Board found that "the private manufacturer has added to the Government cost, on the average, about 11 per cent to represent his profits. It is plain that articles for which special machinery has to be installed and perhaps special buildings erected, if purchased sporadically, cannot be obtained at very close prices. Sound business practice would make it imperative to include in its cost a large depreciation charge. If continuous orders could be counted on, this charge would necessarily be considerably reduced. Any plan of coöperation to that end would not only result in saving to the Government in the price paid, but it would coördinate an organization that would be of the utmost importance to it in time of trouble."

The Board considered the then capacity and output of the Government's plants and concluded that "capacity has no significance except as it bears relation to needs." "So considered," it held, "the utmost capacity of our several arsenals is below even the prospective peace needs of our expanded military establishment and it fades into insignificance when the possible demands of war are called to mind."

And under the heading, "The feasibility, desirability, and practicability of the Government manufacturing arms, munitions and equipment," the Board held: "This board has no real function if war be excluded from the possibilities; therefore, it has based its investigation and proceeds to its conclusions on the assumption that we may find ourselves—and possibly at no distant day—confronted with war on a large scale. On that assumption the question of how we may best provide ourselves with the indispensable material with which to begin an effective defense, as well as to maintain it, looms large, and deserves a full discussion. . . .

"First, let the question of supplying the needful arms, ammunition, and equipment exclusively through Government plants be examined. The highest estimate submitted by the Chief of Ordnance must be taken, because no rational person would set about preparing for a vital need and take the chance of erring on the lesser side. To do so may be fatal.

"The estimates given are approximations only—and necessarily so. But for our purposes it is immaterial whether the sum required is $927,000,000 or $1,000,000,000 or $800,000,000. In any event the sum is enormous. The plants erected

would be in large part idle in the years of peace and deteriorating with each year. At the same time they would be each year passing, in more or less degree, into the category of the obsolete; that is, becoming a dead loss. This results from two facts—first, their output has no commercial market in peace times; and second, their capacity far exceeds the public requirements in these same peace times. Moreover, the most important factor is wanting, i. e., the organizations. It takes more time and costs more money to acquire these organizations than any other element of manufacture. If no other plan offered, a reasonable man might be driven to advocate it as the only available way to insure against a great national calamity. But other ways are open, ways by which productive capital will not be locked up in complete idleness but which will still hold the country in readiness against the critical day. Those who have studied attentively the history of this country in its past wars have been moved to say that in our day of need a benevolent Providence has stood between us and our peril. Today, without conscious effort to that end, a situation has developed through which, if we regard the immediate future as charged with danger, we may also see the workings of that same Providence. For two things have happened, or are in process of development, which go far to insure the safety of the United States, provided only advantage be taken of them. First, the people have been aroused from their dreams of unbroken peace by the appalling European war so suddenly begun and waged with such unexampled energy. So that a national alertness upon this question of national defense now exists which thirty months ago had no being. Second, the demands of the foreign combatants for arms and ammunition have developed in this country a capacity to make them a thousand fold greater than was dreamed of in July, 1914. . . .

"THESE considerations make impossible exclusive Government manufacture, not only because of the enormous capital locked up and wasted through the non-use and deterioration of a large portion of the plants in which it is invested in peace years, but more strongly still because such a plan spells delay—and long delay—which in turn may spell disaster.

"If we are preparing for offensive war, we can, of course, take our time, but if our preparation be solely for defense, for insurance against the aggression or attack of other nations, we can not know when such insurance may be needed. Indeed, we can not fail to recognize the period succeeding the present European war as one fraught with much difficulty and danger. And we can not insure against contingencies which may then arise, except by taking advantage of our present opportunity promptly and vigorously. . . .

"It takes from 18 months to three years to recreate that capacity when once destroyed—to increase the Government plants and assemble the organizations to operate them efficiently or to turn private industrial plants into munitions factories. If our purpose be to prepare to protect and defend the country in time of need, then it is essential first and foremost to provide for an adequate reserve of arms and ammunition as soon as practicable and then to provide a capacity to produce a sufficient supply when and as needed under any reasonable conditions we may be called upon to face.

"From the foregoing considerations it appears to the Board impossible to escape the conclusion that it is not desirable for the Government to undertake, unaided by private plants, to provide for its needs in arms, munitions, and equipment. Nor is it feasible nor practicable to do so in any sense except in the restricted sense of a mere physical possibility."

What the Kernan Board found in 1916 goes as well for all time. Nationalization is proposed to cure alleged ills of the war system. It won't cure alleged ills, it won't eradicate war, it can invite more of both.

ELSEWHERE in this issue is published the report of the American Delegation to the International Conference on the Traffic in Arms held at Geneva in 1925. The purpose of that conference and of the Convention it drafted (which was ratified by the U. S. Senate June 15, 1934) was to formulate some satisfactory method of control of the international trade. In our opinion the Convention when put into effect by other arms-producing countries as well as ourselves will accomplish this purpose. It does not infringe upon our sovereignty, it recognizes that there is a legitimate trade in armament among nations and it is based on the very sound logic that the private manufacture of arms can not in this day and age be entirely eliminated. This Convention would institute a licensing system. Sales to foreign governments by private manufacturers of the United States would be licensed. The advantage of the system would be to curb any illicit trade in weapons —a very worthy objective. The great rank and file of industries which would engage in the licit trade between nations could not be averse to the formal use of this system which has been informally used in the United States by many producers for some time.

Whether the Convention becomes an actuality does not depend entirely upon ourselves. It will not go into effect until the other arms-producing, i. e., industrial, nations agree to do likewise. Thus far Belgium, France, Great Britain and Sweden have agreed. But so far as we know, Czechoslovakia, Germany, Italy, Japan and the Union of Soviet Socialist Republics have not. Here is a case where partial agreement will not do. All industrial nations must agree or the entire plan fails. If this international control agreement should fail there is, as we see it, only one other alternative for the United States should prohibition of the export of armament become our national policy. That alternative is: utilize for the peace-time needs of our own Army and Navy the small quantities of American-made armament now being exported. The thing would be simple enough to provide by law. But never should the capacity and skill of these private organizations be allowed —much less compelled—to fade away. In major emergency they are irreplaceable. In war they could easily be the margin between victory and defeat. In peace they are our first line of munitions reserve.

When all is said and done, let us not forget that arms are the adaptation of peace-time development in every field of science and art for use in national defense. If war is ever hoped to be eradicated through such superficial means as Government ownership and operation, then Government had best decide to own and operate all industry. The simple fact is that all industry in time of modern war is either primarily or secondarily engaged in the conflict. The answer to the question "Shall we have nationalization of the munitions industry in the United States?" can be "yes" or "no." Yes, have it—if the national defense of the United States is not worth caring two pins about; no, have none of it—if we believe we may ever have to defend ourselves, mean to do it, and hope to win. The choice should not be difficult to make if indeed we must choose.

Association Affairs

Biennial Election of Officers

At the biennial election of officers and directors of the Army Ordnance Association held by general ballot September 4, 1934, the following officials were reëlected: President: Brig. Gen. Benedict Crowell, Cleveland, Ohio; Vice Presidents: William W. Coleman, Milwaukee, Wis., and William C. Spruance, Wilmington, Del. (These officers under the constitution serve for a term of two years beginning January 1, 1935); Directors: Maj. Gen. C. C. Williams, U. S. A., Ret., Washington, D. C.; Brig. Gen. Samuel McRoberts, New York, N. Y.; and Pliny E. Holt, Stockton, Calif. (These directors serve for a term of four years beginning January 1, 1935.)

The Committee of Tellers of Election who canvassed the ballots was: Col. Hardee Chambliss, Ord. Res., Chairman; Lieut. Col. Robert P. Parrott, J. A. G. Res.; and Lieut. Col. Colin E. McRae, Ord. Res. The members of the Nominating Committee were: Mr. P. H. Gadsden, Chairman, Col. Henry B. Machen, Ord. Res., Lieut. Col. Alex. K. Hamilton, Ord. Res., Lieut. Col. A. H. Pugh, Jr., Ord. Res., and Col. Charles N. Black, members. To the members of the committees our thanks for their very efficient service. To the reëlected officers and directors the members of the Association have spoken in no uncertain terms the high regard in which their past services are held and the faith placed in these gentlemen whose leadership has guided the organization in the past and will continue in future.

Armament Industry and World Peace

An informal meeting of the officers and directors of the Cincinnati Post of the Association was held October 13 at the residence of Col. C. L. Harrison, Chief of the Cincinnati Ordnance District, where the officers and the Executive Secretary of the Association were the guests of Colonel Harrison at luncheon. In the evening they attended a dinner meeting of the Foreign Policy Association of Cincinnati at which the question discussed was "The Armament Industry and World Peace." The meeting was held in the ballroom of the Hotel Gibson with Hon. Russell Wilson, Mayor of Cincinnati, presiding. The speakers were Dr. H. C. Englebrecht, coauthor of "Merchants of Death," and the Executive Secretary of the Association.

The Executive Secretary will address a luncheon—meeting of the Foreign Policy Association of New York at the Hotel Astor, New York City, on November 24, at which the principal speaker will be Senator Gerald P. Nye, Chairman of the Senate Munitions Investigating Committee. The subject for discussion will be "The Control of Munitions Manufacture." On December 15 the Executive Secretary will address the Foreign Policy Association of Springfield, Mass., sharing the platform again with Doctor Englebrecht.

Ordnance Scholarship at M. I. T.

Army Ordnance Association medals for scholarship during the past year were awarded honor students of the Ordnance Unit, Reserve Officers' Training Corps of the Massachusetts Institute of Technology on October 16th. The occasion also marked the first meeting of the current year of the local post of the Association of which Mr. Reid Ewing is president. The medals were awarded to students who attained highest marks in ordnance scholarship in the junior and sophomore classes of last year. The winner of the junior medal was Mr. Laurence A. Stone, '35, of Roxbury, Mass. He is now among the first honor rank students of his class at M. I. T. and holds a commission as student first lieutenant in the R. O. T. C. regiment. The winner of the sophomore medal was Mr. Leo J. Kramer, '36, of Dorchester, Mass., who holds the distinction of being among the first honor rank students of his class. As a junior he is not yet eligible for appointment as a student officer in the R. O. T. C. regiment. Both medalists were graduated from the Roxbury Memorial High School.

The presentations were made by Col. S. C. Vestal, Professor of Military Science and Tactics at M. I. T., who was introduced by Maj. O. J. Gatchell, head of the Ordnance R. O. T. C. Unit at the Institute.

Preceding the award of honors, senior and junior vice-presidents of the post were elected, Mr. Robert F. Flood, '35, to the senior vice-presidency, Mr. Herbert M. Borden, '36, to the junior office. Mr. John J. Demo, '35, is secretary-treasurer of the post. Following the meeting an informal smoker was held.

Calvin W. Rice

Calvin W. Rice, whose name for many years was a byword among ordnance engineers and executives, died suddenly in New York, October 2, 1934. For the past twenty-eight years he had been secretary of the American Society of Mechanical Engineers and since the World War had held a leading place in those groups of his profession which are particularly concerned with ordnance development. At the time of his death he was a director of the New York Post of the Army Ordnance Association, a charter member of the national organization and a member of the Advisory Board of the New York Ordnance District. He was a colonel in the Ordnance Reserve Corps.

Colonel Rice was a native of Winchester, Mass., and was graduated from the Massachusetts Institute of Technology, a member of the class of 1890. He received a doctor's degree in engineering from the Technological Hochschule at Darmstadt in 1926. Beginning as an assistant engineer of the Thomson-Houston Electric Company in 1889, he became electrical engineer for the General Electric Company in 1893 and later served as electrical superintendent of the Anaconda Copper Mining Company and the Silver Lake Mines Company. Subsequently he was in the employ of the Kings County Electric Light and Power Company, the Consolidated Telegraph and Electric Subway Company and chief of material testing of the New York Edison Company. He held membership on the Board of Trustees of the New York Museum of Science and Industry, the corporation of the Massachusetts Institute of Technology, the Purdue Research Foundation, the American Institute of Electrical Engineers, the London Society of Electrical Engineers, the Masaryk Academy at Prague, the Deutches Museum of Munich and other engineering and technical societies of this country and abroad.

Colonel Rice received the Knight Cross of the Order of the White Lion from Czechoslovakia; he was also awarded the Medal of Honor of the Verein Deutscher Ingenieure at its fiftieth anniversary in Cologne in 1931 for his services to technical-scientific achievement "particularly in promoting mutual international interests of engineers of the entire world."

Colonel Rice had coöperated in many ordnance advancements. He had a keen realization of the dependence of modern armament upon mechanical engineering and had fostered the relationship of both groups in a very material way. One of his particular interests was the National Defense Division of the A. S. M. E., a group which is of inestimable importance to the national defense. His death removes from our roster and from the ranks of engineers throughout the world a leading figure and a talented gentleman who had done much for the good of every professional field with which he was so long identified.

JAMES W. RAWLE

MR. JAMES W. RAWLE, a director of the Philadelphia Post of the Association, died October 4, 1934. He was a charter member of the Army Ordnance Association and, as vice-president and general manager of the J. G. Brill Company, rendered outstanding service during the World War in the manufacture and supply of ordnance material. At the time of his death he was assistant chief of the Philadelphia Ordnance District.

Mr. Rawle was born in Williamsport, Pa., September 6, 1869 where he received his early education. Later he attended Lehigh University specializing in metallurgical engineering. After leaving college he entered the employ of the Bethlehem Steel Company and rose to be superintendent of its open hearth plant and assistant to the president. In 1906 he joined the J. G. Brill organization as assistant general manager, later becoming second vice-president and general manager and in 1926 vice-president and director. He was formerly a director of the American Car Company of St. Louis and of the G. C. Kuhlman Car Company in Cleveland which were subsidiaries of the Bethlehem Company.

Mr. Rawle was vice-president and director of the National Manufacturers Association 1924-26, president of the Pennsylvania Manufacturers Association 1930-31 and at the time of his death was a member of the executive committee and director of their casualty and fire insurance companies. He was well known throughout Pennsylvania as a leader in industrial and business circles. Continuously since the World War he had taken an active interest in ordnance and industrial mobilization planning where his counsel and advice were of great value. In his death the Philadelphia Ordnance organization loses a guiding spirit and the national Association one of its most active friends.

ROBERT D. COOMBS

THE sudden death of Lieut. Col. Robert D. Coombs on October 22, 1934, removed from the roster of the Ordnance Reserve Corps and of the Association an energetic worker, splendid officer and loyal supporter of industrial preparedness. Colonel Coombs died at his home at Paramus, N. J. Only a week before his death he had attended the first meeting of the Reserve Officers assigned to industrial mobilization activities in the New York Ordnance District. For many years he had served as chief of the Administration and Staff Divisions of the district and also as a member of the Executive Committee of the New York Post of the Association of which he was a former vice-president. In point of service Colonel Coombs was one of the oldest officers in the New York District to which he was assigned in 1922.

During the war his principal work was largely in connection with construction problems of the Nitrate Division. He served as a major in the Ordnance Department from December, 1917, until May, 1919, during which time he was stationed in the Office of the Chief of Ordnance at Washington and at Birmingham, Ala. While in active service he was on temporary duty as supervising inspector of the Air Nitrates Corporation; special aide in charge of the Supervision Section, U. S. Nitrate Plant No. 2; officer in charge of construction and miscellaneous advisory duties in the Nitrate Division.

After fourteen years in the engineering profession he became vice-president of Fitzpatrick & Coombs, Inc., engineers and contractors. In 1911 he established R. D. Coombs & Company and served as president of that engineering and contracting organization until his death. He was also active in civic affairs, serving a second term as major of Paramus when he died.

ARMY ORDNANCE shares the sympathy of the New York Ordnance District and the New York Post, A. O. A., upon this loss of a capable public-spirited fellow citizen who gave of his very best talents to the national defense and to the public service.

COL. ORIN B. MITCHAM

COL. ORIN B. MITCHAM, U. S. A., Ret., whose long career in the Ordnance Department of the Army is well known to many members of the Association, died at Fort Jay, N. Y., August 20th. Colonel Mitcham was born in Lynchburg, Va., July 25, 1853, and was graduated from the U. S. Military Academy in 1870. Although retired by operation of law July 26, 1917, he was returned to active duty during the World War as commanding officer of the New York Arsenal, Governors Island, and as Chief Ordnance Officer, Armament Officer and Inspector of Ordnance of the Eastern Department. He served in these capacities until April 2, 1919.

Since his retirement from active service he had held several important posts including personnel director, General Motors Export Corporation, and director, Pierce Oil Corporation.

NEW MEMBERS

THE following have been admitted to membership in the Army Ordnance Association since the last issue of ARMY ORDNANCE: C. E. Adams, New York, N. Y.; Benjamin F. Affleck, Chicago, Ill.; D. O. Amstutz, Ransom, Kans.; Lewis G. Anderson, Indianapolis, Ind.; J. M. Andreas, Princeton, N. J.; Herbert W. Andrews, Westfield, N. J.; O. C. Austin, Madison, Wis.; Albert G. Bagley, Jr., Fresno, Calif.; David C. Bailey, Amesbury, Mass.; John A. Barclay, Jr., Fort Sam Houston, Texas; Luther H. Bender, Wernersville, Pa.; K. E. Bering, San Francisco, Calif.; Edward J. Biel, New York, N. Y.; Bruce A. Bliss, Plano, Ill.; John R. Buhmiller, Eureka, Mont.; B. G. Carlson, Brooklyn, N. Y.; Charles E. Chapel, Shanghai, China; Albert D. Cohick, Nevada, Mo.; Ulysse Cormier, University, Va.; William G. Costin, Pittsburgh, Pa; George W. DeCamp, Penns Grove, N. J.; Richard W. Dickenson, Stanford University, Calif.; James H. Dunbar, Jr., Bridgeport, Conn.; R. W. Farlee, Princeton, N. J.; R. Wallace Fay, Winchester, Mass.; Emil Gathmann, Jr., Catonsville, Md.; E. H. Gill, Princeton, N. J.; Walter T. Gorton, Washington, D. C.; Stephen V. Grancsay, New York, N. Y.; Fred Grau, Spiceland, Ind.; James D. Gulick, Princeton, N. J.; Emory Hawcock, Monmouth, Ill.; William H. Hundt, Forest Hills, L. I., N. Y.; Frank J. Kahrs, Verona, N. J.; W. F. Keenan, III., Princeton, N. J.; George F. Kern, Philadelphia, Pa.; Chase Kimball, Waterbury, Conn.; Erhardt C. Koerper, Chicago, Ill.; Edmund K. Lee, New York, N. Y.; William M. Locke, Omaha, Neb.; Albert D. Loring, Dallas, Texas; W. K. McKnight, Pittsburgh, Pa.; William L. McMillan, Philadelphia, Pa.; Arthur M. Meeker, Hoboken, N. J.; Arthur G. B. Metcalf, Quincy, Mass.; Charles H. Moore, Alton, Ill.; Ivor N. R. Morgan, Elizabeth, N. J.; Edward G. Oliver, Baltimore, Md.; John M. Phillips, Richmond, Va.; Frank F. Reed, Aberdeen Proving Ground, Md.; Robert B. Rockford, Hartford, Conn.; L. R. Schureman, Princeton, N. J.; Henry G. Sharp, Detroit, Mich.; Warren T. Stewart, South Orange, N. J.; R. J. Thoman, Canton, Ohio; Harding Van Schaack, Wilmette, Ill.; Charles P. Weekes, Canton, Ohio, and Noyes J. Wilmot, Penns Grove, N. J.

PHILADELPHIA ORDNANCE DISTRICT ANNIVERSARY

PLANS are being discussed by officials of the Philadelphia Post, A. O. A., for a fitting observance of the seventeenth anniversary of the beginning of World War ordnance activity in what is now the Philadelphia Ordnance District. While eleven Ordnance Districts, as such, including Philadelphia, were established March 26, 1918, historically-minded ordnancites of the City of Brotherly Love claim their organization had its origin on January 16, 1918. The celebration will be held under the auspices of the Philadelphia Post, the date, place and program to be announced later. No doubt, other local posts also will observe the anniversary dates of their Ordnance Districts.

Professional Notes

Machine Tool Builders Committee

A COMMITTEE of the National Machine Tool Builders Association to coöperate in industrial mobilization planning met in Washington as the guests of the Army Ordnance Association September 25, 1934. The Committee membership is as follows: Walter W. Tangeman, Chairman, Cincinnati Milling Machine Company; Herman Lind, General Manager, National Machine Tool Builders Association; Clayton Burt, Pratt & Whitney Co.; F. H. Chapin, National Acme Co.; R. E. Flanders, Jones & Lamson Machine Co.; and E. A. Miller, King Machine Tool Co. Capt. R. E. W. Harrison of the Machinery Division, Department of Commerce, also attended. The purpose of the committee will be to study the machine tool problem of war-time supply in its relation to industrial mobilization. It is realized that in time of emergency some central coördinating control will be necessary to insure that the industry is utilized in a manner most conducive to the military effort of the nation. Such insurance can be obtained through coöperation and study of this committee.

There are many problems connected with the entire question which require the best thought of those familiar both with the industry and with the industrial effort required in time of war. This first meeting was instrumental in placing before the committee a visualization of the broader aspects of industrial mobilization and is a step toward coöperative effort upon which the industrial preparedness phases of the National Defense Act depend. The committee is now studying some phases of these problems and as a continuing body can be of great value. The Army Ordnance Association congratulates the Machine Tool Builders on their public spirit and is pleased to proffer its good offices in every way which might assure the readiness and maximum utilization of the industry in time of war.

Ordnance Training Courses

ON THE ROSTER of training courses for Ordnance Reserve Officers during the past summer two—those at the Rock Island Arsenal and University of Michigan—were unusually successful. The Rock Island Camp was conducted from July 9 to 22 with Lieut. Col. A. G. Gillespie, Commanding Officer of the Arsenal, as Camp Commander. Capt. Guy R. Hartrick, Ord. Dept., was Director of Training.

The basic course of instruction included the following subjects: mobile artillery, 19½ hours; tanks, tractors and motor carriage artillery, 4½ hours; small arms and machine guns, 9 hours; fire control instruments, 3½ hours. (These courses were under the direction of Maj. L. H. Campbell, Jr.); field service activities, 9¾ hours; ammunition, 2¾ hours. (These courses were under the direction of Captain Hartrick); pistol practice, 6¼ hours, and shop practices, 2¾ hours (under Lieut. Leslie S. Fletcher). The officers in charge of the several subjects were assisted by civilian department heads of the Arsenal.

In addition, the following special lectures were given to the class: "Automotive Matériel, with Special Reference to Tanks and Combat Cars," by Maj. H. A. Nisley, Office of the Chief of Ordnance; "Machine Guns and Equipment," by Capt. Thomas J. Heavey, Cav.; "Mechanization," by First Lieut. H. D. Heiberg, Cav.; "Industrial Preparedness," by Major Campbell, and "Military Courtesy and Discipline," by Captain Hartrick.

COL. ALFRED H. WHITE, Ord. Res., Professor of Chemical Engineering at University of Michigan, at the request of the Editor of this Journal, prepared the following account of the Reserve Officers' Training Camp conducted at the University. We are indebted to Colonel White whose eminent war service as an Ordnance officer and whose zeal for Ordnance progress since the war days is well known. Colonel White's account of the training course follows:

The third Ordnance Reserve Officers Training Camp at the University of Michigan was held during the period July 29 to August 11 with twenty-six student officers in attendance. The standing problem before the group at the University of Michigan is the development and operation of a loading plant for artillery ammunition. Before officers can intelligently discuss this subject it is necessary that they have a basic knowledge of explosives and the properties of metal components. Most of the student officers took three courses: the Properties of Explosives; Gaging Metal Components and the Duties of an Inspector; and the Properties of Metal Components. A few of the officers with more specialized training did advanced work in these fields.

The staff consisted of reserve officers who are members of the teaching staff in the Engineering College. The Commanding Officer was Col. Alfred H. White, Ord. Res., Professor of Chemical Engineering at the University. The teaching staff consisted of Maj. C. Upthegrove, Spec. Res., Professor of Metallurgical Engineering, Maj. J. C. Brier, Spec. Res., Professor of Chemical Engineering, and Maj. F. A. Mickle, Ord. Res., Associate Professor of Mechanical Engineering. Capt. A. B. Custis, Ord. Dept., acted as Adjutant and Instructor in Pistol Practice and Captain C. B. Peirce, Med. Res., as Medical Officer.

Special lectures were given by Dr. Alex Dow, Chief of the Detroit District Ordnance Office, on "The Need for Industrial Preparedness"; by Maj. A. B. Quinton, Ord. Dept., on "Industrial Mobilization", Lt. Col. F. C. Rogers, Inf., on "The Organization of the Army", Col. H. W. Miller, Ord. Res., on "Artillery Problems", Maj. J. S. Worley, Q. M. Res., on "Development of Transportation", and Lieut. Col. Calvin H. Goddard, Ord. Res., on "Identification of Bullets and Cartridge Cases After They Have Been Fired".

A fraternity house was rented for the officers by Captain Custis, who acted as house manager.

The day's program started with setting-up exercises and a swim in the pool of the Michigan Union adjacent to the fraternity house. Classes commenced at 8:00 and continued until 3:30. Opportunities for tennis, golf and swimming were provided for the late afternoon. The standard field uniform as prescribed for the 6th Corps Area was obligatory during the working day. The last day was given over to written examinations on the courses which had been studied.

It was a fine group of student officers. They were interested, worked hard and seemed to enjoy themselves.

Ordnance in the National Guard

AN INTERESTING note was sounded by Maj. Gen. George E. Leach, Chief of the National Guard Bureau, in his address before the members of the National Guard Association in annual convention at Nashville, Tenn., October 18th. This concerned the constant progress being made in the replacement of horses maintained in the Guard through motorization of field artillery. Through this means the number of animals has been reduced from 7,000 to 5,500. However, as a result of the transfer the remaining organizations of the National Guard have nearly their authorized number of animals. To take care of replacement, as funds are not available for procurement, the supply to meet training needs will become increasingly difficult. Regarding ordnance in the National Guard General Leach said:

"All the guns of the light field artillery regiments have now

been adapted for high speed and it is thought the main wrinkles in connection with this change have been ironed out reasonably well. Two spare wheels and tires have been furnished each battery. Improved lubricating devices have been installed. Gun carriage covers are now being made which will protect the gun and mount from mud and dust while on the road. New lunettes are being provided to carry the trail higher and trail hand-spikes of a satisfactory design. There has been a change in the point of view of the Chief of Field Artillery regarding the use of shields, which have been removed; there is a possibility that these will be replaced, using either the old shields or those of new design. All regiments of field artillery have now been supplied with a field artillery trainer. If this device meets expectations, it is hoped that before long we can procure enough additional units to equip every battalion thus avoiding the delays and inconveniences attendant upon passing the trainer around.

"New machine gun tripods of a universal ground antiaircraft type are being issued on the basis of four per machine gun organization including, for the cavalry, hangers to fit. The caliber .22 machine guns have been delayed in manufacture and will probably not be available before next July. It will not be possible to qualify men this year in this weapon. A limited number of light machine guns which are designed eventually to replace machine rifles in rifle troops of cavalry were issued; but this weapon cannot be used this year on account of the lack of an approved qualification course.

"Due to the abandonment of our wartime automotive equipment, the tank companies are going to be hard hit. As far as can be seen, the companies will have no opportunity for genuine training in the use of tanks for several years. In some cases it may be possible for a tank to move to a firing point on a target range and fire the prescribed course, but I realize that sometimes this will not be feasible. The personnel of the tank companies can, of course, continue with their machine gun practice on ground mounts.

"Since the 37-mm. gun may be discarded in the new model tank, the supply of this weapon on a ground mount is not contemplated.

"The antiaircraft program while not as extensive as is desirable, appears to have every prospect of being approved. This program when complete, will supply every regiment with three modern guns, an instrument trailer, a director, and a reasonable quota of searchlights and sound locators."

General Leach also called attention to the added cost of Army motorization due to delays from Congressional and other investigations and decisions of the Comptroller General. He pointed out that in the case of motors for artillery had the delays not occurred there would have been a saving of $313,951.51 effected in transportation, forage and caretakers during the training season. In the case of motors for state pools the saving would have amounted to $729,845.38. These delays, according to General Leach, resulted in a loss to the Government of a total of $1,043,796.89.

A Monument to Frederick A. Geier

THE ARMY Ordnance Association joins its congratulations with those of industrialists and engineers throughout the country to the Cincinnati Milling Machine Company which this year is celebrating the fiftieth anniversary of its founding. During the week of October 8th thousands of friends visited the company's plant in Cincinnati to convey congratulations and to observe the company's latest developments of machine tools shown in a most interesting exhibit.

The celebration was also a tribute to the late Frederick A. Geier and his loyal co-workers whose idealism and energy built the institution. Mr. Frederick V. Geier, president of the company, is a director of the Cincinnati Post of the Army Ordnance Association. To him, the officers of his company and the employees, ARMY ORDNANCE adds its felicitations. Organizations such as theirs are of vital importance to the technical and production facilities of the national defense.

Ordnance Patents

ORDNANCE patents of recent issue include the following:

Patent No. 1,972,113 for a trigger mechanism which has been granted to Lieut. Leslie A. Skinner. In this device the usual form of trigger is replaced by spaced-yielding members between which the finger is drawn. The object of the device is to eliminate flinching.

James C. Karnes has been granted patent No. 1,973,716, for a compass, the object of which is to provide means for lifting the needle off its pivot and holding it while not in use.

Maj. Hermann H. Zornig, Ord. Dept., has been granted patent No. 1,973,738, for a fuze for projectiles. The fuze is armed by a combination of set-back and centrifugal force.

Capt. George H. Rarey, Inf., has been granted patent No. 1,974,432, for a shield for observation openings. This is a special shield of bullet-proof glass for the observation ports of a tank so constructed that it will seal the opening against the entrance of gas.

Patent No. 1,974,429 has been granted to George H. McCann for a gun having a combined breech ring and jacket. It presents a novel method of holding the loose liner against horizontal and rotational movement, the breech ring being formed to permit insertion of the liner from the rear.

Patent No. 1,972,886 has been granted to Capt. Elmer C. Goebert, Ord. Dept., for a crank axle suspension intended primarily for gun carriages.

William T. Ingraham has been granted patents Nos. 1,972,891 and 1,972,892, for a method of extracting diphenylamine. The method consists in washing comminuted smokeless powder at room temperature in acetone and water or acetic acid and water in specified proportions.

Patent No. 1,968,836, for a system of and apparatus for visually interpreting the operation of a control mechanism, was issued to Mr. Karnes and Gregory J. Kessenich. The invention relates to a motion picture record of views from an airplane as observed by the operator.

Captain Goebert has been granted patent No. 1,970,560 for a gun carriage with crank axles to allow pneumatic tired wheels to be mounted thereon.

Patent No. 1,971,348 has been granted to Harry A. Knox for a track for track-laying vehicles in which a special cap fitted on the end of each link pin is provided.

Mr. Knox and Capt. Thomas H. Nixon were granted patent No. 1,964,735. The invention provides a special arrangement of rubber bushings to take the place of springs in the suspension of vehicles.

Mr. Knox was also granted patent No. 1,966,450, for a track for track-laying vehicles in which the track has rubber shoes and the link pins are anchored against rotation to prevent wear.

Proof Tests and Proof Marks

By Calvin Goddard

To meet the demands for complete copies of this series of articles, which appeared in ARMY ORDNANCE from the issue of November-December 1933 to July-August 1934, a 14-page pamphlet reprint has been published and is now available at $3.00 the copy. Orders, with remittance, should be addressed to The Army Ordnance Association, Mills Building, Pennsylvania Avenue at 17th Street, N. W., Washington, D. C.

Book Reviews

Oliver Cromwell. By John Buchan. Boston: Houghton Mifflin Company. 1934. $4.50.

THE LIFE of Oliver Cromwell is of particular interest to military students of English-speaking nations, not only because of the fact that he was one of the greatest leaders that the race has brought forth, but because he shared the fate of nearly every commander of our common history in that it was necessary for him to build up an army after hostilities had commenced. Although the scale upon which he worked is small compared with our modern experience of nations at war, the principles which he sketched for us are so clearly defined that the most ardent follower of Clausewitz must admit at least their instructive value. And if there turn out to be any truth in the warnings of the prophets of mobility, then the training and quality of highly mobile striking forces may have a decisive effect upon the issue of future wars as frequently has been the case in the past. Like the Golden Rule, the quality of troops has received the lip service of men for ages, but seldom has the common sense of a commander induced him to withstand the temptation of quantity at the expense of quality. In this respect alone Cromwell's courage entitles him to the salutes of the military profession; for not only did he announce his conviction that "a few honest men are better than numbers", but he put the dictum into effect, and thereby laid the foundation of his success.

As a background for this study of the Protector, Mr. Buchan has provided an estimable survey of British thought, politics and religion in the first half of the seventeenth century—a transitional period of long ago piled with shadowy furniture which in many respects seems strangely familiar to modern eyes. Tudor individualism was suffering its first check, and the grit of economic nationalism had gotten into the worn, medieval gears. The outgrowths of the Reformation chafed men's dispositions; the rising cost of government thinned their purses. The ruling minority imposed its experiments with unfortunate consequences, and Cromwell's "sluggish conservative mind" failed to provide an enduring result. In the end, the sane political instincts of the English people prevailed. But throughout the long period of civil disturbance, the dominating figure was this military genius, a general who planned his operations "with a view to the moral as well as the physical victory which the crisis demanded."

"Oliver Cromwell" is not light reading; Mr. Buchan provides such diversion charmingly in numerous other volumes, but when he enters the realm of serious history he drives on with the relentless vigor of Oliver himself. Those who are familiar with the historical works of this author have come to expect much when they open one of his books. In the present case they will not be disappointed. Careful research ornamented by an astounding wealth of allusion is the background for his clear and finished prose, and he has accomplished a great deal toward enabling a modern to understand the motives and actions of the seventeenth century Roundhead. If one would learn the way in which environment, occupation and mental concentration go into the making of a noble man and a great soldier; if one would view the tragedy, Shakespearean in quality, of a good man who was doomed at the moment of apparent triumph to realize the failure of his mighty efforts; or if one would study the campaigns of the most original great captain that an Anglo-Saxon nation has produced, this book is recommended. J. M. E.

Riders of the Sky. By Leighton Brewer. Boston: Houghton Mifflin Co. 1934. $2.50.

TO THE great epics of the World War, both prose and poetry, must be added "Riders of the Sky" by Leighton Brewer who served his country in the American Flying Service in France, and who remarks in the foreword that his story in verse is a combination of fact, fiction and legend.

Like all true poetry emanating from the soul of an artist, this book has the faculty of making the reader one with the drama unfolded. From the first line to the last we live Bob Wainwright's experiences as an aviator, his successes and failures. In No Man's Land and behind the lines we come face to face with heroes on both sides the trenches whose names made history during the momentous years of 1914-1918. If certain passages of stark realism bring a shudder to sensitive readers, the fine emergence of the main character recalls a splendor not unlike that of Sir Galahad in his quest for the Holy Grail.

The author says he wished to portray the spirit of the War days, to preserve a picture of it for the men who shared that life, and to honor those who went to fly in France and did not return. Mr. Brewer has done all this and more—he has given us an epic poem which will be a worthy companion to other fine works produced by the War. G. J. C.

The Modern Gunsmith. By James V. Howe. New York: Funk & Wagnalls. 1934. $15.00. (After Jan. 1, 1934, $20.00.)

TWO QUARTO volumes of 424 pages and twenty-nine chapters each bring us, in very readable style, Mr. Howe's ideas on gunsmithing. That these constitute the last and most comprehensive word on the subject at the present day is not open to argument. For what Wigmore is to Law, and Osler was to Medicine—Howe is to gunsmithing. In his chosen field, his name is one to conjure with.

There is no question but that he has treated his subject exhaustively. Volume one, for the beginner, devotes some sixty-seven pages to the fitting up of a workshop, the selection of tools, and general equipment. Proceeding to actual practice, we find a whole chapter on woods for gunstocking, and the properties good and bad of some twenty-eight varieties available, the very names of many of which will be new and strange to a goodly percentage of his readers.

Thereafter, no less than one hundred and fifteen pages—a veritable book in itself—carry on the story of the stock, its design, layout, inletting, modeling and shaping, the bedding of barrels and actions, finishing, checkering, carving, inlays, emergency surgery, and lastly, the employment of laminated wood.

It would be fruitless here to attempt a concise resumé of the remaining subject matter embraced within the two volumes. Suffice it to say that it is just as comprehensive with respect to every other field exploited (and none that pertain to gunsmithing directly or indirectly is omitted) as it is in that of stocks and stocking. Thus a whole chapter of volume two (for the advanced artizan) is devoted to the art of bluing and browning—offering no less than forty-nine formulas for these and similar operations!

Other subjects treated include (in volume 1); The Modernization of Military Small Arms, Fitting of Sight Equipment, Hand Forging and Heat Treatment, Pistol and Revolver Repairs, Amateur Etching and Engraving, etc., etc., while volume 2 offers, among scores of other interesting subjects, much technical information on tool and die making, metallurgy, barrel manufacture, the fashioning of sights, springs, bullet molds, etc., and the restoration of antique weapons.

The cuts throughout both volumes (there are 171 in volume 1, and 183 in volume 2) are of high quality, well chosen, and sufficiently pertinent to the subject matter to enhance interest.

It is regrettable that Mr. Howe was evidently unable to reread and bring up to the moment certain portions of his manuscript before submitting them to the printer. Thus he describes the manufacture of the 150-grain Springfield service bullet and its use by our armed forces, decrying the fact that we have not as yet adopted one of the boat-tail variety. Since the latter type has been in use by the United States constantly since early in 1926, this would indicate that these portions of the work have not been gone over for eight years or more! Other indications of failure to keep abreast of the times also appear.

In addition, there are numerous typographical errors which should have been caught and corrected. These include the misspelling of proper names, the listing of incorrect addresses, and miscaptioning of illustrations.

But these are, after all, matters of small moment. Mr. Howe has given us a work that will stand unrivalled—probably for a generation at least. He who would be counted among the ranks of those who love guns—not for what they can kill, but as examples of rare craftsmanship, cannot afford to be without it.

C. G.

AMERICA'S TRAGEDY. By James Truslow Adams. New York: Charles Scribner's Sons. 1934. $3.00.

THE intelligent American who reached maturity before Jackson's first inauguration and managed to survive the succeeding thirty-seven years, was privileged to witness the most colorful and most fatefully eventful period of our history. He saw a revolutionary extension of the franchise, the beginning of the machine age, the sudden expansion of his country's boundaries to the Pacific, political and social turbulence of bewildering intensity, with the climax of the first great war of masses. At the bottom of the latter sorry business was sectionalism. The nation had become divided into two parts which proceeded to develop along divergent lines, with the result that politics became inflamed with the misunderstandings between the sections. A condition that blossomed from the seed that had been planted at the time of the unfortunate visit of "a Dutch man of warre that sold us twenty Negars".

The violent differences that grew up in the country with a geographical boundary line to emphasize antagonisms, and the astounding catastrophe that followed, Mr. Adams views as America's Tragedy. He has used his charming talent for narrative to mold the amorphous and still somewhat explosive mass of material into a book that should be read by every American. The author's style and purpose prevent his dwelling weightily on particular features that usually exert a fatal attraction for historians, nevertheless he points out the changes that were wrought, both in the lives of the people and in their fundamental law, by the irresistible will of a majority. His clear demonstration of this ponderous force is of immense significance to our groping generation. The Civil War is covered briefly, but the reader is given a glimpse of the men who were fighting and of the motives that urged them on; and, in the final analysis, men and motives merge into the soul of war. The clarity with which the subject is presented and the absence of prejudice should cause the book to be sincerely welcomed by those who are interested in this period of American history.

J. M. E.

ARMS FABRICATORS—ANCIENT AND MODERN. By Robert Edward Gardner. Columbus, Ohio: F. J. Heer Printing Company. 1934. $6.50.

FRANKLY, Mr. Gardner's volume is disappointing. The fraternity of arms enthusiasts, long awaiting its arrival, will find in it many names and private marks of ancient gunmakers and swordsmiths, the compilation of which is an accomplishment for which the author deserves due credit. But the omissions, particularly with regard to makers of arms of the metallic cartridge era, are numerous and glaring. This is largely explained by the absence from Mr. Gardner's bibliography (which fills the last six pages of his volume) of Satterlee's "A Catalog of Firearms for the Collector!"

Why and how this occurred, only Mr. Gardner can explain. But no person familiar with the history of the arms industry in the United States—and the first 113 pages of the present volume are devoted to this—could possibly succeed in covering thoroughly the names of those participating in this, without frequent and comprehensive references to Satterlee. To ignore his work in a volume such as Gardner's is to confess a task half finished.

Similarly, when we scan the pages devoted to arms fabricators overseas, the omission of names well known in Spain, Belgium, France are at once noticeable. For instance, among the list of some thirty-four Belgian makers of pistols and revolvers registered as current producers on page 225 of ARMY ORDNANCE for January-February, 1934, not a single one of these is found in Gardner, though the list includes such names as Fabrique Nationale, Francotte, Galand, and Nagant—names well known to the veriest tyro in the field of arms. A similar result rewards a search for some hundred-odd names of current Spanish arms makers filed in the records of the reviewer. To cite one of these, Orbea of Eibar stands unmentioned. Passing to Italy, Glisenti is missing, in Germany—Borchardt; Mauser is dismissed with the statement "Gunsmith of Germany—1876"! Mannlicher finds no place in the Austrian records, nor Kropatchek in Russia. Schouboe is passed by among Danish products—as are Krag and Jorgensen in Norway, and Sjögren in Scandinavia.

Omissions in America include Andrew Fyrberg and the whole line of arms initiated by him and later made in countless thousands by Sears-Roebuck in their Meriden Fire Arms Co. plant. Other names almost equally well known but not to be found in the present volume are those of the Thames Arms Co. and the Warner Arms Corporation of Norwich, Conn., the Union Fire Arms Co., of Toledo, Blake, Kolb of Philadelphia, and scores of others.

Among the errors that careful proof reading should have eliminated are the spelling of "Deringer" as "Derringer", that of Major Bashford Dean, late arms curator for the Metropolitan Museum as "Brashford Dean", the statement that Harry M. Pope, world famous barrel maker was "active until 1902"—(he still makes scores of barrels yearly) and similar slips.

To Mr. Gardner's credit be it said that he has printed much information upon *ancient* arms and fabricators which is not readily located elsewhere. Thus the little known Virginia Manufactory receives several descriptive lines which are highly valuable, as do Henry Hawkins (Hawken), Thomas Blanchard, John Cookson, (whose repeating flintlock musket is the jewel of the United States Cartridge Co. Collection now in the National Museum in Washington) and others whose histories are only too fragmentary.

Had the author limited his book to fabricators prior to the metallic cartridge era, the volume would merit much more commendation than can be accorded it in its present form. Nevertheless, it stands as a definite contribution to previously available sources of information on this fascinating subject, and will doubtless take a place among the reference works in the field—now all too few.

C. G.

DEMOCRACY AND MILITARY POWER. By Silas Bent McKinley. New York: The Vanguard Press. 1934. $3.00.

IN THIS work, the author glances hurriedly back through the long corridor of European history and points out that peoples have invariably lost their individual rights and civil liberties when they have become unable or unwilling to hold these advantages by physical force. The spectacle of governments changing through the well worn cycle of oligarchy, tyranny, and democ-

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racy has occurred so often in the past that we can hardly escape the logical deduction with respect to the future. But Mr. McKinley has brought into the picture a thought that is of special interest to the military student. He succeeds creditably in establishing a direct relationship between democracy and the power of infantry. He shows that when the common people can be readily converted into effective fighting forces, these masses have developed the habit of ousting their tyrants. Also, he points out that, because of cost and other factors, infantry is the only practical arm for the lowly. Conversely, when the people weary of war, or when changes in military technique reduce the potency of infantry, their power vanishes. He does not hesitate to announce the true direction of his reasoning; that democracy can be maintained only when every man is a soldier (as with universal service), or when no man is a soldier. He does not, however, pursue the logic of his argument to its bitter end, though this end is implicit in his thesis. It will be interesting to see if he will care to carry forward his discussion to the conclusion he has indicated, i. e. given human nature as it is, democracy and peace are incompatible.

The book contains a few minor inaccuracies, and it suffers from the hasty treatment which is probably inevitable in an attempt to reduce twenty centuries of warfare and government to some three hundred pages of print. But in spite of imperfections, it is worthy of the attention of thinking men. An added attraction is the introduction by Professor Charles A. Beard.

J. M. E.

Der Kampfwagenkrieg (Mechanization). By Artillery General Ludwig Ritter von Eimannsberger, Austrian Army Retired. Munich: J. F. Lehmanns Verlag. 1934.

Was the tank in the World War capable only of creating panic among war weary troops or was it a machine inaugurating a new method of warfare? This is the question which the author seeks to answer in this well prepared book. Whether or not the reader agrees with General von Eimannsberger's conclusions, his thoroughness fills one with respect.

The tank actions of Cambrai, Soissons, and Amiens are covered in detail as are the German attacks without tanks at Soissons and Reims, on the Marne, and in the Champagne. The method of treatment is novel, comprising conditions leading to each, preliminary preparations, the course of battle, and separate discussions of the tactics of the attacker and of the defender. In these, the author makes use of much new German archive material.

In the tank actions the author claims the tanks showed their ability to break through but that the Allies failed to develop a means of exploitation, while the Germans failed to concern themselves seriously about tanks either in attack or defense. Strategically, the keynote of the German offensives of 1918 was their combat mobility against the Allied transport mobility which had the tactical effect of causing the German offensives always to remain frontal. A comparison of statistics leads to the conclusion that, with tanks, the losses of the attacker were fewer than those of the defender. Without them it was the opposite.

The book also covers a general discussion of tank development since the war and a specific discussion of antitank possibilities, including infantry weapons, artillery, mobile reserves, tanks as antitank weapons, and the types of tank attacks likely to be met.

A hypothetical battle of Amiens as it might have taken place occupies the latter half of the book. It describes the situation as it was on August 8, 1918, and takes up a futuristic offensive based on the supposition that both sides had become newly equipped with modern vehicles. The plan of action and conduct are in detail and are followed by a critique. The author's treatment is refreshing as he equips both sides with similar weapons

and wisely refrains from continuing the action beyond the second day. Only two criticisms are offered of this part. The author's logistics would seem to be based on an optimistic view of the speeds of armored or motorized formations. The second is that small sketch maps inserted in the text would have added immensely to his interesting war game.

It is the author's conclusions that: (a) It took from September, 1916, to November, 1917, to teach the users of tanks that they can only be successful in masses and that, in future, no army will dare use them otherwise; further, that no large scale offensives will ever again be possible without them. He points to the tank plans for 1919 as an indication of the real lesson of the war which has been forgotten but which quickly will be remembered and placed in effect in the event of another war. (b) Cavalry is definitely obsolete. (c) Surprise attacks opened by artillery preparation are no longer advisable because of modern tactical dispersion, increases in number of machine guns, and artillery ballistic improvement which defeats its own ends. These would all necessitate so much advance preparation that surprise would be impossible. Tanks, on the other hand, can move up so rapidly that not even their infantry need know in advance where an offensive is planned. (d) There must be a high proportion of AT weapons in the infantry regiment. The future field gun must be a combination AA, AT, and divisional gun and must be motorized. Half the artillery must be assigned to AT duty in "islands" for all-round fire. (e) Tank and airplane coöperation will be a definite actuality. (f) Future warfare will quickly settle into position warfare with land and air fleets doing the fighting. Such wars will not end until the industrial organization of one side or the other gains the ascendancy or runs out of raw materials. For this reason, warfare today and tomorrow requires freedom of the seas.

The author definitely belongs to the Fuller school but nevertheless his book should be in the library of the serious tank student or the student of the World War. Although viewing only the effect of the tank on Continental warfare he is quite fair in his viewpoint and free from the usual Germanic bias. He may be visionary but he has made a serious study of a serious study. To those who question the effect of the tank on future warfare he points only to the effect of the machine gun on the last one.

R. J. I.

CODES, CARTELS, AND NATIONAL PLANNING, The Road to Economic Stability. By Bruno Burn. New York and London: The McGraw Hill Book Company. 1934. $4.00.

IT SEEMS that under modern conditions some form of business combination is inevitable and, in fact, a free market, absolutely devoid of collusions, is one of the rarest phenomena of human intercourse. Call them trusts, holding companies, syndicates, trade associations, unions, codes, cartels or a similar ingenious term that expedience may suggest, they pop up like weeds during a rainy June, and to the hard pressed ultimate consumer "that which we call a rose, by any other name would smell as sweet". But fortunately for business enterprise the ultimate consumer is not articulate and it takes little effort to persuade him that all is for his own good. Accepting, therefore, the world as we find it, Dr. Burn's exposition of codes and cartels is a timely and valuable study. In his opinion, the cartel form, which has been developing in Europe over a period of half a century, is more advanced than—and is preferable to—the codes as we have them. There is little ground upon which to dispute his contention. Unless members of a given industry are particularly recalcitrant, in which case the government takes a hand in restraining them, their cartel is a voluntary contractual agreement, the terms of which are enforceable by law. Thus the old warfare of corporations is replaced by a more orderly system

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where ethics have some chance of survival and extravagance in its most harmful forms is curtailed. The author makes it clear that the grouping of our industries into codes or cartels will not bring the millenium; his attitude is rather that it may be possible by codes or cartels to avert a rapid descent into chaos.

His discussion of national planning is of immediate interest to the military student. The Army, generally considered as made up of the most thoroughly conservative body of men in the country, has been studying national planning for over a decade. The purpose of the soldiers is to insure the smooth functioning of the nation's industries as well as of their own supply systems in war. In truth the idea is as old as the hills, but economic nationalism, relatively an infant though lusty, seems to be forcing us into something of the sort. Dr. Burn's arguments will leave little doubt of its desirability from the standpoint of the economist. It is definitely in the "national interest" (to use one of Professor Beard's favorite terms) that coördinated effort and informed reasoning be substituted for the old cat-and-dog relationship of government and industry. This book will be valued by any one interested in the evolution of our economic structure. In the appendix there are several examples of existing cartel agreements.

J. M. E.

Meriwether Lewis of Lewis and Clark. By Charles Morrow Wilson. New York: Thomas Y. Crowell Company. 1934.

This biography of Captain Meriwether Lewis is based on Lewis' own writings as contained in his journals, diaries and letters. Use was also made of War Department and State Department files, as Meriwether Lewis was a prolific correspondent, particularly with Thomas Jefferson.

There seems to be available a great deal of valuable material upon which to base the biography, such as the diary which Lewis kept and one which Clark also kept of the transcontinental exploration, generally known as the Lewis and Clark expedition. The author acknowledges assistance from a number of authorities, among them Colonel Bernard Lentz, Office of the Chief of Infantry, whom he refers to as an eminent student and interpreter of military history.

This biography naturally contains a great deal of information regarding Thomas Jefferson, as Meriwether Lewis was a close personal friend of the President and was his secretary and military aide. The author paints a very interesting picture of the early life and atmosphere of the Lewis family. The biography is as interesting as fiction and to any one who feels the thrill of exploring unknown places this book is highly recommended.

It is interesting to note that Lewis left Pittsburgh the last of August, 1803, with his expedition but it was the middle of May, 1804, before he left St. Louis on his way up the Missouri. The first winter found him at Bismarck, North Dakota, and he reached the Pacific the latter part of November, 1805. He came back faster than he went, as he was back in Washington in the fall of 1806, a total elapsed time of three years. This trip can be made now by a flier such as Rickenbacker in 12 hours.

The book would be improved if the map which accompanies it were a little more elaborate so as to include the time at which the expedition reached various important places. It is very hard in reading the biography to follow the map chronologically.

Thomas Jefferson seems to have chosen the one man in the United States at that time who was capable of making a successful trip to the Pacific and back. It was unfortunate that Lewis, in taking his own life when Governor of Louisiana Territory, cut short a career which seemed to have been so promising and which would have done so much for the territory which he was so instrumental in opening to the progress of civilization.

G. P. W.

ROMANTIC COPPER—ITS LURE AND LORE. By Ira B. Joralemon. New York: D. Appleton-Century Co. 1934.

"TRUTH is stranger than fiction." And Mr. Joralemon's book is replete with instances of that adage.

The chance turning of the pages of a book on archaeology by an unsuccessful copper prospector while waiting in the New York Public Library for a young lady led to the rediscovery of the copper mines of Cyprus after they had been abandoned and forgotten for two thousand years.

The burning of a brush heap on an ore dump of the Rio Tinto mines in Spain produced a new method of recovering copper from low grade ores and made possible the profitable reopening of those mines on which once was based the glory that was Rome, even though they had been idle for several centuries.

The willingness of a surveyor to help a lonely squatter in the Lake Superior region to hunt for his lost pig led to the discovery of the Calumet and Hecla ore bodies.

And Butte—originally founded as a gold mining settlement—existed for some time on the silver produced. Then W. A. Clark, Marcus Daly and F. Augustus Heinze successively entered the picture. Butte became one of the biggest copper mining areas in the world and thereupon began to unfold one of the most amazing tales of American life—the wealth that soon became theirs, the senatorial ambitions of Clark, the vindictiveness of Daly, the treachery of Heinze, the corruption of the Montana courts, the battles in the underground galleries that honeycombed the richest hill on earth, the ramifications of the Anaconda and the Amalgamated copper companies.

Because a mine foreman refused to obey orders and stop running exploring cross cuts, ore bodies were located that proved to be the mainstays of the Copper Queen for forty-five years, permitted the payment of $20,000,000 in dividends, made James Douglas the leader among American mining engineers and raised the Phelps Dodge Corporation to the pinnacle of financial success and power.

A forty-seven year old shiftless cow puncher in Arizona, inspired by the news accounts of the wealth and glamor of the Butte mining and financial operations, had a vision of locating a mine that would dwarf the Butte activities. One day his cows led him to the slopes of the Cananea Mountains and thus Bill Greene located the copper deposits in which he built the Cananea Consolidated Copper Company with all its complications, subsidiary companies, Wall Street operations and financial bubbles.

And so the story goes on, tracing a fascinating path, telling of fraud and folly, swindling stock salesmen and spurious spiritualists, scientific fraud and engineering errors, stupendous development expenditures and fabulous dividends, and bringing out names that are high lights in mining, copper metallurgy, finance, pioneering, and empire building. Even the names have a romantic ring—Morenci, Naeozari, Verde, Kennecott, Inspiration, Cerro de Pasco, El Teniente, Katanga and Roan Antelope.

Read the book! Written in a style the nontechnical reader can understand and equipped with a glossary of the technical terms which are unavoidably employed, it reads like a novel and is as fascinating as any "best seller." R. M.

NAVAL CUSTOMS, TRADITIONS AND USAGE. By Leland P. Lovette, Lieutenant-Commander, U. S. N. Annapolis, Md.: U. S. Naval Institute. 1934. $3.75.

WHY is five bells in the second dog watch never struck in the Royal Navy? Where is officer's country? Did the United States Navy participate in splicing the main brace with the officers and men of the Royal Navy at 1900, 11 November 1918? What is the relative seniority of the United States Army, Coast Guard, Marine Corps and Navy? Did Lawrence or Perry say "Don't give up the ship"? Which naval officer in the wardroom

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Answers to these questions and an abundance of other esoteric information can be found in Commander Lovette's excellent book. Originating as a course of lectures to student officers at the Post Graduate School in Annapolis, it now appears as a compendium of the traditions, customs and usages of the sea. It is from tradition, handed down through the generations, that morale and discipline of organizations and individuals are inspired. It was naval tradition that dictated the actions under stress of the crew of the dirigible AKRON, just as it dictated the actions of Hull and his men of CONSTITUTION, though many years had intervened and the service totally changed. The Navy is fortunate in having its *lex non scripta* so ably and so interestingly made a matter of permanent record.

The book is, in a word, a source book, an ensign's *vade mecum*, and an Emily Post combined in one. It is not always easy reading because its continuity is unavoidably interrupted and some portions of it that deal with social usage and correspondence could probably be abbreviated to advantage. Withal, it is a book that should prove indispensable to naval officers and extremely valuable to others who are interested in the sister service or in the sea.

C. McK.

THE NEW INTERNATIONAL YEAR BOOK. A Compendium of the World's Progress for the Year 1933. Edited by Frank H. Vizetelly. New York: Funk and Wagnalls Company. 1934.

FOR many years now, in fact since 1924, it has been our pleasure to review in these pages the annual New International Year Book. Our contact with it began in the days when Maj. Herbert H. Wade, who was on duty in the Ordnance Department during the World War, was the Year Book's editor. For this and other reasons ARMY ORDNANCE has always felt a close association with this annual volume and has taken an especial interest in its yearly appearance.

Brig. Gen. John J. Bradley, U. S. Army, Ret., has contributed for a long while the article on military progress which, while not our sole interest, is nevertheless our most important one. Indeed the entire field of current affairs is so generously covered in the Year Book that to review it accurately would embrace a discussion of major proportions. Consequently it is our custom to confine ourselves to military progress.

General Bradley as usual presents a comprehensive review of the military activities in the larger countries, the lion's share of discussion being devoted to the United States. We are impressed with his details and descriptions of professional development particularly as regards antiaircraft and ordnance matériel. Discussing the National Defense Act of 1920, General Bradley claims that the Act in reality does not lay down a military policy of any kind and that "if we really want to be prepared for the next war the National Defense Act must be overhauled". It is a pity that the author did not go into this phase of his subject in a little more detail as the nature of the demanded overhaul would be of interest. It seems to us that what the United States lacks in the way of a military policy is not attributable to the Defense Act as much as it is to the changing notions of Congressional and Senatorial representatives. The Act itself is an epitome of World War experience. If the lessons it teaches are not carried out and reflected in policy, if the burden of carrying out a general mobilization scheme without a trained reserve and no effective means of training such a reserve is placed upon the War Department the fault is not of the fourteen year old Act but rather, we believe, of the attitude of the people through their representatives toward these very necessities. This article discusses the importance of mechanization and motorization both to the Regular Army and the National Guard and all in all is a fitting contribution to a volume of unusual value. L. A. C.